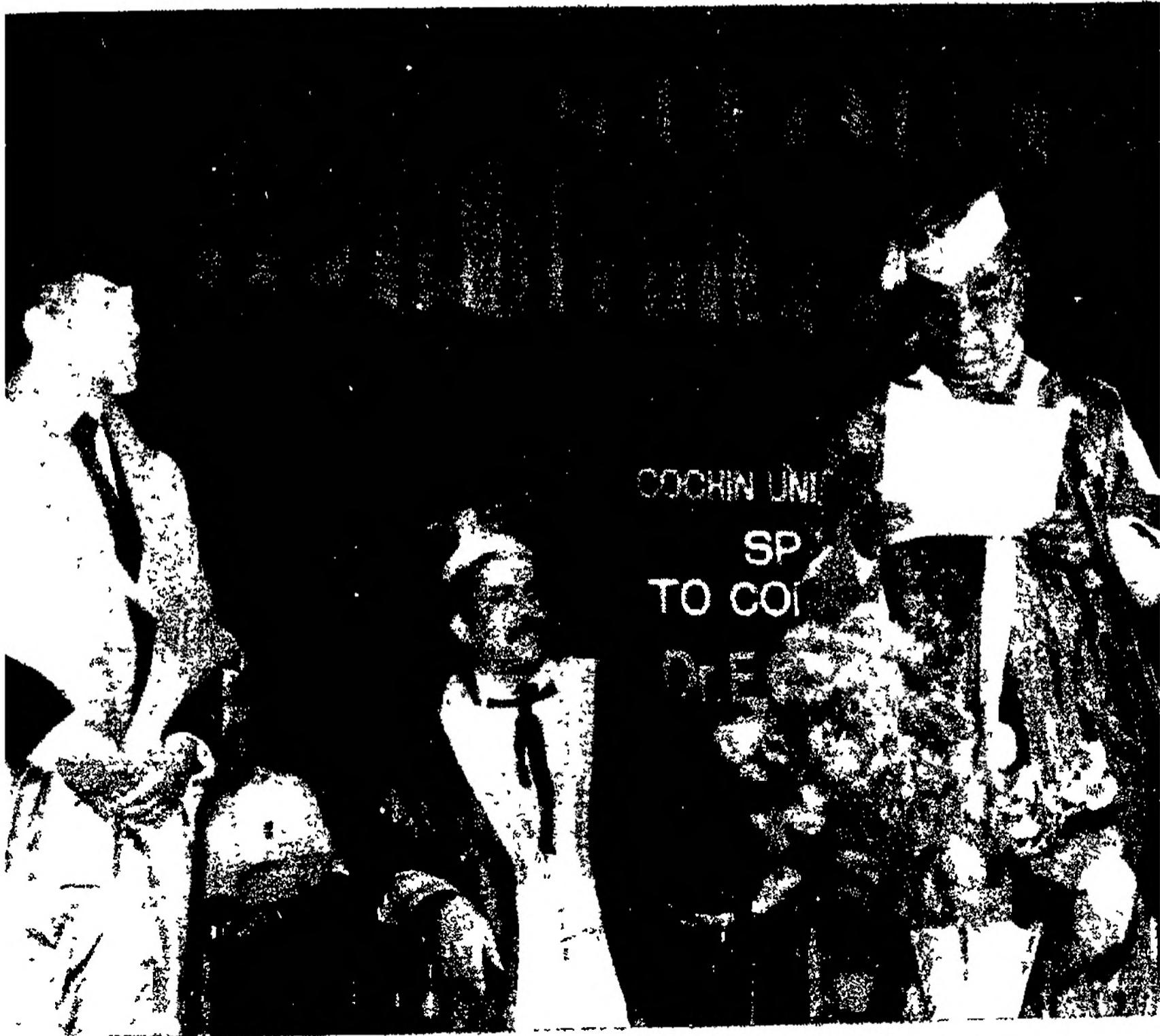


University News

MONDAY, MARCH 8, 1993

Rs. 5.00

Cochin Varsity Convocation



From L to R : Prof E.C. George Sudarshan, an eminent scientist, who was conferred the degree of Doctor of Science (Honoris Causa) at the special convocation of the Cochin University of Science and Technology,
Mr. E.T. Mohamed Basheer, Kerala State Education Minister and Shri B. Rachaiah,



G.B. PANT UNIVERSITY OF AGRICULTURE & TECHNOLOGY
PANTNAGAR-263145

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Editor:
SUTINDER SINGH

Excellence Vs Accountability in Indian Science

Pawan Sikka*

India has a long and distinguished tradition in science : the mathematical discoveries, urban planning on geometric basis, medical findings leading to the development of Ayurveda, metallurgical skills, astro-astronomical observations, etc. The real Indian awakening in modern science took place through the personal efforts of a large number of outstanding Indian scientists who worked over the three quarters of the century prior to independence of the country. For example Sir C.V. Raman was awarded Nobel Prize in Physics in 1931, for the famous Raman Effect; while Bose-Einstein equation and "Bosons" were discovered by S.N. Bose; Meghnad Saha was honoured for Saha theory of Ionization; J.C. Bose received international acclaim for his pioneering work on millimeter waves as well as plant sciences, A.S. Paintal won acclaim for excellent work on J. receptor in physiology, Bhabha is known for research on fundamental particles, etc. Thus, science was then a personalised activity in India.¹

From Private Science to Government Science

The Colonial British period developments in S&T took place to cater to the requirements of the then Government. Survey organisations were established to collect data on the flora and fauna in India. The outbreak of the second World War (in 1939) brought about a radical change in the pattern of scientific and technological research in India. From the concept of private science, it became in reality the government science. Pandit Nehru, in 1938, sent a message to the Silver Jubilee Session of the Indian Science Congress at Calcutta, that :

"It is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and dreading customs and traditions, of vast resources running waste, of a rich country inhabited by starving people. Even more than the present, the future belongs to science and those who make friends with science."

The government headed by Pandit Nehru, India's first Prime Minister, thus expressed the implicit faith in the use of science to obtain material well-being for the Indian people. Political and government support led to the institutionalisation of science in India, that is, a Council of Scientific and Industrial Research (CSIR) was set up in 1942, Tata Institute of Fundamental Research was set up in 1945. Homi Bhabha's vision led to the setting up of Bhabha Atomic Energy Research Centre, Bhatnagar's effort created a chain of national laboratories, and Vikram Sarabhai's vision saw the emergence of Space Research Centres in India. Thereafter leadership to these and several other R&D institutions was provided by the students of the above said eminent scientists i.e. Bhagvantam, Krishnan, Ramanathan, etc. But the efforts of many others who came to head the R&D laboratory system later transformed it to an extension of the university system. The concept that S&T was needed to underpin and to accelerate the national development had to await the change in the ethos on the scientific scene.²⁻⁴

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Science in India

Science in India drifted from the personal academic pursuit of truth/excellence to the institutionalisation/compartmentalisation for its immediate social relevance. Though the basic orientation of S&T policy has been and still is, to treat science and technology as an integral part of socio-economic development, there have been several changes in the organisation and planning strategies over the years. These changes have generally directed S&T from an infrastructure and capability-building phase (1947 – 1960's) to assessment and reorientation (1970 – 1980s) on to performance and accountability.⁵ Further with a view to steer the S&T development in the country, the Government of India

- encouraged the setting up of educational or technical institutions in the country;
- promoted the establishment of R&D institutions,
- provided the financial support for carrying out the S&T efforts, and
- enacted policy instruments, Acts etc., to channelise it in the right direction.

The Government of India became a major patron of science in the country. India's expenditure on R&D has increased from 0.2 percent of GNP in 1958-59 to 0.89 percent of the GNP in 1991-92. Various educational institutions were established alongwith technical, medical and agricultural universities to produce qualified manpower in the country. Today, India has third largest S&T manpower in the world which is estimated to be about 38 lakhs in 1991-92. It has made rapid strides and have achieved self-sufficiency/self-reliance in many areas, such as agriculture, atomic energy, space, ocean exploration, medicine/health care, industry, etc. The S&T expenditure in successive Plan periods has increased from Rs. 20 crores in 1951-56 to Rs. 7537 crore in 1985-90. The basic contributor to the R&D expenditure is the government (85-90%) of which most of the funds, say, about 80% come from the central government.⁶ The Government of India has expressed her reasons/desire of funding S&T in the country, in her Scientific Policy Resolution of 1958, viz.–

"To foster, promote and sustain, by all appropriate means, the cultivation of science and scientific research in all its pure, applied and educational aspects."⁷

The development of India's science and technology has been, on the one hand, in relation to the great advances that have taken place in S&T in the world as a whole, and on the other hand, to the compulsions of ensuring that it is relevant and serves the overall purpose of development of the country. These efforts have led to the capability-building in many areas of S&T towards achieving self-reliance in the country.

The leaders of the Indian Science in post-independence era like Homi Bhabha, Vikram Sarabhai, MGK Menon, MS Swaminathan, AS Paisat, CNR Rao, etc. who after excelling in science and making their names in their chosen area of research, have devoted a lot of their time and energy for the policy, planning and management of S&T towards the application of S&T in independent India. But it was done voluntarily at the cost of their scientific advancements, because it was very essential for the development of India. However, many of our young brilliant scientists have left India for higher studies/pursuit of science abroad and settle themselves there unlike in earlier times when Indian scientists did go abroad but used to come back to serve the motherland i.e. to pursue science, create a school of fellow scientists, develop application oriented science leading to the economic upliftment of India. Thus drifting of the scientists from the climax of research career to policy planning issues; and the brain drain among the cream of budding scientists seems to be the two chief reasons why India did not get any Nobel Prize in the Independent India, if it is any yardstick for excellence in science.

Accountability

Science without originality has no meaning. Science flourishes wherever originality is encouraged. Basic science requires least amount of management and the largest amount of freedom to think and discuss. Applied science calls for accountability in which economic considerations play an important part. There are various types of accountabilities, that have come into existence in the recent past. These are social accountability, environmental accountability, quality and excellence of the scientific efforts, and above all, the financial accountability.

Accountability of science should be measured in terms of its objectives i.e. what exactly we want to do and how much we get or why there occurs a gap in the expectations? Accountability in the early years when the

scientific effort was on smaller scale, depended entirely on the personality of the scientists e.g. Raman, Bose, Saha, Krishnan and in the later transition stage Homi Bhabha, Bhatnagar, and others. Raman could make original contributions to science with a self-designed experiment costing a few thousand rupees. Their pursuit of science and devotion to perform basic research led them to achieve excellence in science, and make a mark in the world-science.⁸

The scientific scene got changed and science was made to serve the cause and upliftment of society. There arose the concept of management of science – which is a complex subject itself as each set of scientific problems requires a special kind of management. A number of issues arise with regard to the management of S&T such as administrative aspects, training, and imparting public awareness of the scientific results. We have an experience of several models in the management of science and technology in India. These are

- * Agencies and structures like CSIR, ICAR and ICMR which are multi-institutional and have mandate to develop S&T in very many broad areas;
- * Commission structures like Atomic Energy Commission and Space Commission – dealing in focused, time based and large programmes with functional autonomy and have generally performed well;
- * At the institutional level there are national laboratories, institutes and centres; and
- * Other broad type of structures which bring together various agencies and institutions for coordination purposes i.e. for inter-institutional and/or interdisciplinary aspects.

There are many institutional programmes, inter-institutional ones too and mission-mode projects with large investments involving several organisations at different places in the country. It is a challenge as how to bring them together into an effective management structure to ensure proper return from such investments. There is, maybe, a need as felt in some circles, for creating now a corporate type of structure to manage science in India.

Management by Objectives

We have moved from individual science to team science and then to institutional science. The principle

of management of scientific infrastructure in terms of public accountability would remain the same as the management of infrastructure in any other discipline. A reasonable approach to scientific management would emerge if management by objectives (MOB) is done through a matrix system.

The principle in the matrix mode of management suggested here is that the organisational system of the institution should be so seen that the non-intellectual part is managed by the routine exercise of the management principles and the scientific aspects are managed by the scientists so that the intellectual advancement is maintained. The infrastructure management must coordinate with science and scientific operations. To maximise the total S&T system, we should optimise the constituent sub-systems. Both these streams should be managed by corporate directions in order to maintain a balance between the two streams. In such circumstances, the accountability in terms of returns and results to the organisation would be optimised.

But the present demand of the time calls for the development of immediate linkages among the application of science for the development of society. The interaction between science and society requires the development of applied science and for which no Nobel Prize has been instituted (otherwise Japan would have bagged most of them in the past four decades) as a measure of excellence as well as accountability in applied science.

It is a challenge to the scientific community to come up with their own indicators/parameters by which they be judged. There should be some correlation between the inputs and output in science in India. Unless the scientists are bound morally to these issues the question of accountability will remain unanswered. The question of accountability in science will remain a concept – the building up of which would be difficult to conceive and demonstrate. It should be viewed in totality by the scientists, administrators, financial experts as an integral part of the S&T system in India. Though it appears that both excellence and accountability oppose each other to some extent, it is necessary to find ways and means for their peaceful co-existence in a developing country like India.⁹

Critical Analysis

It is observed that the attainment of national as well as international honours, including the award of prestigious fellowships, Nobel Prize or a breakthrough in science can be considered as a yardstick for the measure of excellence in science. Here, in this context it is seen that any of the Indian scientists of the present generation achieved professional eminence by dedicatedly pursuing research work in their chosen area of science, as a personalized activity. At a critical time, when they exhibited "Spark" after devoting a good span of their life, they came to the notice of the government who felt like utilizing their expertise for the development of S&T in the country, and sought their advise by associating them in various professional committees. This made it difficult for them to manage both the activities at the same time i.e. vigorously pursuing the scientific research and conducting the tricky affairs of science policy - planning and management. It took them unawares and drifted them from real scientific career. This drift actually happened at a time when they were in the thick of the matters to make a breakthrough in science. But it occurred so swiftly that it was too late to realise the transition. After some time they resumed the scientific research and found that during the intervening period, the progress in S&T took place with leaps and bounds and it became difficult to catch up.

It is suggested that the eminent scientists should participate in the policy-planning exercise to the barest possible and leave the job to trained administrators so that their own scientific career is not disrupted. It should be viewed from the long-term benefits of S&T in the country. This non-linear transformation of an eminent scientist, from the pure research career to science administration and back, can be termed as Sikka Swift Drift in excellence Vs accountability in scientific career.

Secondly, migration of qualified manpower or the brain-drain among the brilliant young scientists, who after attaining scientific proficiency/capabilities at home go abroad and do exceedingly well there and settle themselves there, deprive India of the promising opportunities of inculcating excellence in science in the country. If they decide to come back, it would dramatically change the national scientific scene. Efforts are

required to reverse the brain drain and utilise the services of NRI scientists in enhancing the S&T capabilities of modern India.⁹

Finally, the health of science in India, was even a matter of great concern to the Science Advisory Council to the Prime Minister, which under the chairmanship of Prof. CNR Rao, has suggested several measures for the overall management and research & development of science in India.¹⁰ A great deal of effort is now called for to bring in better levels of science and technology into the lives of people so that they can derive greater economic benefits. This will be the greatest challenge not only for the application of science but for the organisation of the national scientific efforts in the country. Serious efforts are required for the better management of science and technology without sacrificing the basic concept of excellence against accountability in India.

[The views expressed in this paper are the personal views of the author.]

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Private Provision in Higher Education

Myth and Reality

C.R. Mitra*

Introduction

Recently a spate of media comments has erupted on certain aspects of education. Earlier there was a small ripple in connection with the so called capitation colleges for engineering and medicine. After the matter went to the Supreme Court the item has receded from the headlines. Currently the main target appears to be privately provided training institutions that prepare the students for a career in computer application. The comments appear to be highly self-righteous and moralistic through innuendo and selective reports. This industry has been accused of violating all kinds of provisions of the UGC Act, MRTA Act and the DOEADC. Choosing the theory of 'rotten apple' the handling of the reports has at least not made a distinction between good apples and bad apples.

In the context of the all round financial crunch which prompted the Government of India to declare that it would not be able to continuously subsidize higher education even at the present level, it was hoped that unmet demands of education and training could be increasingly provided through private resources. Thus, it would have been more useful if a total perspective was invoked in presenting these news items. What is required is to clearly search for alternate money and bring an infusion of market forces and a sense of greater financial accountability into the higher education system as a whole. In fact the word private provision is not clearly defined and a meaning is imposed on the basis of the ultimate object of a report. This article would attempt to offer an overview, identify the various kinds of private provisions and suggest a more meaningful approach so that private and public provisions may co-exist and compete amongst themselves just what a

liberalised economic policy has sought to achieve in the industrial sector.

A Sketch of Private Role

The higher education system in which this article includes all postsecondary education and training would be highlighted both as a system as well as the operational manifestations to delineate the private role.

a) SYSTEM CLASSIFICATION

(1) Universities or Colleges

These are largely a creation of the government or approved by the government. The genesis is invariably an Act of legislature. They award degrees in the nomenclature determined by the UGC Act. Private participation in this sector has been strictly according to the predetermined curricula, method of examination, physical and infrastructural facilities. Thus, the role of the private sector is limited to supplying additional money to meet increasing demand.

(2) Recognised Institutions

These are accorded governmental blessings through administrative action rather than an authority of an Act of legislature. They award diplomas, which by the virtue of governmental recognition, are accepted as equivalent to certain degrees. There are also private sponsors of such institutions, once again within governmental boundary conditions.

(3) Educational Institutions Outside the above two

These have taken a recognisable shape over the last two decades. They are neither recognised by the government nor are they an outcome of an Act of legislature. They exist because there is a need or because there is a market which uses a trained student. They also award diplomas or certificates on the proficiency attained by the student. They include training and coaching institutions and inhouse training in large in-

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dustries (public or private). The knowledge or skills areas covered by them almost include every professional area which improves the job opportunity of a student. To mention a few, computer, hotel management, general management, word processing, secretarial training, advertising, fashion design, journalism, sales, etc. In addition to the above there are professional societies which arrange training for professionals in a field of specialisation and pronounce judgement by award of titles called Graduate, Associate and Fellow.

The size of this informal system outside the pale of the formal is almost equal to the professional component of the formal system. It is often not realised that most of these training institutions willy-nilly give the training after the first Bachelor's degree (B.A., B.Com. and B.Sc.) or impart the training concurrently with the pursuit of Bachelor's degree. They charge economic fees. They do not receive any subsidy from the government. On the other hand they pay tax to the government. It is an oblique commentary on our education system that lakhs of persons try to add value to their Bachelor's degree in order to become employable. The media comment has not touched upon this phenomenon nor has tried to bother about the issue of relevance between Bachelor's degrees and these training programmes.

b) NATURE OF PRIVATE ROLE

- (1) Having structurally delineated the private participation, it will be useful to examine the same matter through certain standard manifestations of the operation of an educational institution.

By Money

Government is the largest provider and it sets the tone of all aspects of education simply by the virtue of the fact that it provides the money. If part of the money comes from private sources it is the government purpose which has still to be fulfilled. Privatisation in this situation simply means that the unmet demand would be fulfilled through reduced inflow of money from the government. However, no one has bothered to estimate the justification for manpower projections once again made by the government.

By Rule

Government lays down all rules governing such institutions. The ostensible reason is the need

to maintain standards of education. If one were to examine the mechanism by which these standards were made one sadly comes to the conclusion that these standards are nothing other than mindless repetition of curricula, mode of delivery and organisational structure prevalent for almost 100 years. No concessions are made for needs of innovation, international knowledge explosion, undisputed failures of a system maintained through priming of money and benevolence.

By Examination

Ultimately these standards are pronounced through external examination. The examples of internal examination are very few to deter from the central observation. The private role so far in the formal system has been on the basis of acceptance of verdict by an examination system maintained by the government. Recently some efforts have been made to offer centralised government regulated examination to the informal system.

By Fees

This is an item which generates much discussion and is often used to denounce private participation. It is one thing to accept that the fees should not be exorbitant but it is a totally different problem if we want to relate cost with fees. Fees are nothing but a price that is charged for a service or a product. If costs of all items have escalated it is strange that one still argues in favour of maintaining the price of educational services at the same level. Further, there has been no systematic study on the cost of education to even obtain an overall perspective.

By Threat of Punitive Action

Having allowed private money to flow into a predetermined system the government in its wisdom established various agencies to continuously monitor the private role in terms of fees to be charged and impugned malpractices.

Conclusions

- (1) The private role in the formal system has been within the framework of a fixed prototype. It has not received any dynamism of business efficiency or market forces, even though some of the providers have come from major industries.
- (2) The informal system has remained largely invisible because the providers have not taken an academic

position and the formal system has largely ignored it, but the customers, i.e., the students subscribed to it in large numbers. They invariably find that it is necessary to add value to their formal degrees through this informal system.

- (3) Irrespective of our personal views postsecondary education and training needs private resources in order for the nation to meet its manpower requirements. There simply exists no other alternative to this hard fact.
- (4) The issue cannot only be shortage of funds. The simultaneous question would be whether we are using the funds frugally and efficiently. It would therefore be necessary to turn to private experience in management and to have respect for the market forces. Posing these basic questions we will be able to address the problem of productivity in education and cost-effectiveness.
- (5) The formal system because of its sluggishness has not been able to always immediately and effectively update the curriculum and make it relevant to the world of employment. Once again tips on relevant curriculum will emanate from the practices of private educational entrepreneurs.
- (6) If the country's requirement of supply of manpower as well as the unmet demands of young people have to be faced, it would be dysfunctional if we cannot take advantage of the informal system which exists and serves the purpose. Thus instead of falling prey to the theory of 'rotten apple' we should at least ensure that the configuration of the good apple is also written about and brought to the notice of the public. In this matter it is to be hoped that governmental agencies like the UGC, MRTPC, DOEADC, etc. would develop a wider perspective and role. To act purely as a monitoring agency in search for the bad apple is historically invalid now. With their rich experience they can easily become enabler and facilitator to help the informal system become visible and join the mainstream of higher education. Too often the so called public impression is invoked to depart from the letter and spirit of the Act. If public impression is antagonistic to the Act, there are only two alternatives—amend the Act or educate the public.
- (7) The worldwide movement has already entered a domain where the relevance, financial viability and good management techniques have been increasingly demanded from all formal higher education systems. In India, we will not be able to sustain a

flabby and largely irrelevant system through government subsidy and maintain a detached aloofness towards the training industry. It would be vitally important for all of us to develop new attitudes and create an optimum network of providers by congruence of the formal and the informal systems.

A Call for Purposeful Action

We have so far been guided by the bureaucrat's vision of the education system. This vision must be enriched by the practical experience of educational entrepreneurs. The initiative has to come both from private providers as well as the various governmental agencies. Once again there should be an exit policy in education by the government and a greater liberalisation of attitudes towards all educational systems in the country. If initiation has taken place in the field of industrial production, the follow up will invariably overwhelm the higher education system. It would be more prudent if the system takes the initiative and leadership rather than wait for the inevitable to happen.

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Some Thoughts on Planning in Higher Education in India

P.H. Sethumadhava Rao*

There has been an unprecedented, phenomenal expansion of higher education in India during the last 45 years. As a result of this unplanned expansion, the quality of higher education has deteriorated over the years. It is paradoxical to see that in India, on the one hand, the opportunities for young people for getting admission to colleges and universities have increased considerably and on the other hand, the universities have not been able to maintain the academic excellence for a variety of reasons. There is a need to evolve a strategy whereby quality, quantity and equality are maintained which is a difficult task indeed.

- The country inherited a system of higher education which was not only small and microscopic, but also qualitatively dysfunctional in relation to the task of development of an Independent India. In 1948, eminent educationist Dr. S. Radhakrishnan suggested the need to establish an apex body like the UGC for coordination and maintenance of standards in higher education. This was done in the year 1956 by an Act of Parliament.

As a result of quantitative growth in higher education, we have today over 200 universities (including deemed to be universities) and more than 7000 colleges in the country. In spite of this tremendous expansion in the field of higher education, India is regarded as the third largest country having maximum number of illiterates. The population explosion in the country makes it impossible to provide access to higher education for all the youths. Less than 10% of the population are enrolled in higher education. In other words, 90% of the population is still deprived of higher education in the country and some of them may be really deserving.

The quantitative growth has resulted in a major mismatch between output of educational institutions and the demands of employment sector. The pressure to expansion, mismatch of supply and demand and limited resources pose a serious problem to the educational

planners in India. As a result of tremendous growth of higher education, the following problems have emerged :

1. Unplanned proliferation and inadequate infrastructure in terms of teachers, buildings, libraries, laboratories etc.
2. Mismatch between education and employment and lack of planning in setting up of new universities/colleges has led to frustration – the main cause of unrest in the college and university campuses.
3. A dismal dilution of standards.
4. Frequent disruption of academic activities and increase in number of strikes.
5. Most of the universities have not been able to follow the minimum academic calendar of 180 working days in a year due to various types of disruptions (notable exceptions are institutions like Sri Sathya Sai Institute of Higher Learning (SSIHL), Prasanthinilayam, A.P.).
6. Some of the best talented students from IITs, IISc Bangalore and AIIMS, New Delhi go abroad resulting in brain-drain.
7. There has been a steady erosion in the quality of higher education institutions which were earlier considered as the top ones. The reason being tuition fees has remained static over the last 40 years and the expenditure has increased manifold. This results in increase of sub-standard institutions of higher learning.
8. In many states the entire salary component of the teachers and maintenance cost of buildings/laboratories is met by the state governments which has resulted in corruption. In other words, at some places people paying donations are appointed or the persons who pay more donation to the institution are selected and best teachers are not selected. This has resulted in a vicious circle of not maintaining proper standards. This is true in respect of admission of students also.

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Considering all the above aspects, we can say that there is a need for proper planning in the higher education sector.

If quantitative expansion is seen as a means of promoting equal opportunity or making access to higher education for the low-income groups, one can say that it has failed miserably. In fact the concept of higher education to a majority of standards instead of providing equal opportunities to all, has aggravated the inequality over the years. Over two thirds of India's university/college beneficiaries are from the top 30% of society. Only 5% of the student population is from the poor families. Whether it is rich or poor, the public subsidy has been the same. Over the years, the top students seeking admission in the colleges/universities/IITs are from the high income group. They have access to special coaching right from the school level. The so called public schools in the country have created a partition among the common learners. Parents are ready to pay heavy donations/fees and get their children admitted to the public schools. It is a matter of great concern that the students studying in the government schools are the ones completely neglected both by the government and the teachers in the school. The inequality gap widens when they seek admission in the colleges. The unaided private institutions have become money spinning sources for the management people. In many states, privatisation has resulted in lowering of academic standards in professional education like Engineering and Medicine.

Thanks to the verdict of the Supreme Court of India, henceforth it will not be possible for the private sector to start sub-standard medical colleges in the country. If sub-standard doctors and engineers are produced by the private institutions because of less efficient teaching staff, it will be great danger to the society or humanity as a whole. At any cost, quality has to be maintained in engineering and medical colleges. We hear a number of cases of negligence by doctors and engineers at many places; this is mainly due to the sub-standard quality of education that they have received by paying high capitation fees. Though education is on the concurrent list, this fact has not been properly looked into.

Enormous increase in public expenditure on education has led to drastic resource constraint. Strategies have to be evolved to raise non-budgetary resources for education. Continuous government support has made the people more passive, which must change. Univer-

sities should be encouraged to generate funds through consultancy, commercialisation of research output, interaction with industries, etc. All holidays in the campuses should become 'holy days' for generation of funds.

If we want to reduce the burden of the government on higher education, some immediate steps have to be taken to maintain the quality of standards. It is pertinent to observe in this connection that some of the top educational institutions in western countries have been established, financed and managed by private enterprise or a consortium of business donors and the community has been greatly benefited from it; the laws in these countries allow substantial tax benefits for private contributors towards promotion of education. Another fact is that slowly the government expenditure on higher education has been reduced considerably, in western countries like UK, USA, etc. In India, the rate of subsidy is very high and as a result most of the government income is spent on the maintenance of the colleges/universities resulting thereby a great negligence of primary and non-formal education. Education/literacy are definite parameters for the growth of a country which may solve the problems of poverty and unemployment to some extent. Unfortunately, we do not plan with regard to the number of graduates required in different sectors. As a result we face a situation of having a number of unemployed and unemployable graduates. Proper planning in higher education calls for the following :

1. Existing institutions be made self sufficient by reducing drastically the government subsidy.
2. In order to see that the quality of standards are maintained, the universities/colleges should be accredited once in three-five years. Only graduates passing out of the accredited institutions should be employed by the various private/government agencies.
3. Before any new college/university is set up, a proper survey has to be made to find out the need and also to identify the private donors who can run the college/university with the minimum government support.
4. While government supervision is absolutely necessary at all stages, a standing committee consisting of representatives from the UGC/State Government/public personalities should be constituted to monitor the progress of the college/university and keep the atmosphere free

- tion of the resources which will help qualitative upgradation in higher education.
5. The Industry has to play a key role in promoting and financing research and in the maintenance of technical institutions to a great extent.
 6. While students from all sections must be admitted on the basis of an admission test, it would be necessary to provide more scholarships/freeships/loan scholarship for the deserving. Such a step will enable the institutions in increasing the tuition fees which has remained static for over 45 years.

A bold and new strategy has to be worked out for financing higher education on the lines suggested above.

It must be remembered that we have institutions like SSIHL, Prasantinilayam where no fees are charged and excellent students come up every year. Even the hospital which is in the vicinity has excellent facilities which can be compared to any famous one in the world.

Presently we find that in view of large number of students passing XII class with high percentage of marks, admission is being restricted to a handful of students. The students with less percentage of marks are denied admissions in the colleges. While the talents among the students with lower percentage cannot be ruled out in view of our examination system which is based on memory, provision should be there for admitting students from all categories.

Another way is to have more vocational colleges so that they shall be able to join job-oriented courses. Distance Education has to be given high priority. The admissions should be based on entrance test as is in the case of IITs, and at some universities so that all motivated students have an access to higher education. Some of the dropouts owing to personal reasons should have access to higher education through distance mode of education.

As Dr. Radhakrishnan has rightly pointed out, "Today, when our country is passing through a crisis, the only demand that one can make on all educated men is to use their education, their skill and their wisdom for the purpose of integrating society and not disintegrating it." This is more relevant today.

The education system needs to be restructured and updated and it is necessary to weed out the outmoded branches of study, introduce innovative ideas to combine theoretical knowledge with practical training. The

curriculum content of collegiate education has remained static for a long time. There is an urgent need to revise and update the curriculum, particularly at the undergraduate level to make it more dynamic and relevant to the socio-economic needs of the country. The National Policy on Education has recognised the organic link between higher education and social, economic, cultural and moral and spiritual issues facing humanity.

Educational management should be supervised by people who have a broader vision. This includes bodies like Academic Council, Board of Studies and Executive Council. All Boards of Studies in the universities should have top academics in that discipline who can set example by framing proper syllabus, suggesting proper examiners and taking decisions on academic matters in the interest of the discipline.

The planning also requires a formulation of a comprehensive policy on higher education based on a countrywide mapping of needs of human resource development plans in the country pertaining to all sectors of economy, social life, culture and global relationships.

Development of alternative mode of higher education, particularly the distance mode at all levels is necessary to cater to the needs of an increasing number of learners.

Autonomy is an indispensable ingredient of the process of planning, instruction, evaluation and management of higher education. Accountability and autonomy should go hand in hand.

We are now amidst a mire of adhocism trying to meet the challenges of education which is still based on a colonial model. The system may break at any time giving rise to a volcano. It would be wiser if we plan in such a way that we do not reach the stage of volcano at all.

The higher education system should start thinking in terms of generating its own resources. Total dependence on state funding should be reduced; the only way we can impart quality education is to recruit best teachers and introduce innovative measures in teaching so that we impart socially relevant and need based education. The planning has to be in this direction only.

All is not well with our universities. There are rich traditions, abundant manpower, technical knowhow and it is for us to see that our universities function with a high degree of responsibility and maintain academic standards.

Higher Education in U.P. in the Eighth Plan

L.N. Mittal*

The Constitution of India embodies the principles on which the national system of education is perceived. This implies that upto a given level, all students, irrespective of caste, creed, location or sex have access to education of a comparable quality. To promote equality, it will be necessary to provide for equal opportunity to all not only in access, but also in the conditions for success. To eradicate prejudices and complexes transmitted through the social environment and accident of birth, awareness to 'equality of all' has to be created through the national system of education. In this context, higher education has a pivotal role to play to reflect on the critical social, economic, cultural, moral and religious issues facing humanity. It contributes to national development through dissemination of specialized knowledge and skills. In view of the unprecedented explosion of knowledge, higher education has to be dynamic as never before. In the Indian context three sets of activities - teaching, research and extension (community action) are assigned to higher education.

U.P. is the most populous state in the country. Since population is the ultimate beneficiary of development process, it would be appropriate to first review the availability of natural resources in the state in relation to its population.

The share of the state in the country's geographical area is only 9.0 percent as against its share of 16.5% in population. The state is characterised by the abundance of small villages according to population size. This phenomenon itself adds to the magnitude of efforts required for development.

Table 1 : Urban Population & its Occupational Distribution

	1971	1981	1991
Urban population (in thousands)	12389	19899	27653
<i>Occupational pattern of workforce</i>	1971	1981	1991
Agriculture	78.0%	75.0%	73.0%
Industry	7.9%	10.0%	5.0%
Others	14.1%	15.0%	22.0%

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Table 2 : Average Annual Growth in Total Income and in Per Capita Income of U.P.

	<i>Annual Growth in total income - %</i>		<i>Annual Growth in per capita income - %</i>	
	<i>U.P.</i>	<i>All India</i>	<i>U.P.</i>	<i>All India</i>
1951-52 to 1955-56	2.0	3.6	0.5	1.7
1956-57 to 1960-61	1.9	4.0	0.3	1.9
1961-62 to 1965-66	1.6	2.2	0.3	0.0
1966-67 to 1968-69	0.3	4.0	1.5	1.8
1969-70 to 1973-74	2.3	3.3	0.4	1.1
1974-75 to 1978-79	5.7	5.3	3.3	2.9
1981-82 to 1984-85	4.00	4.8	1.8	2.6
1985-86 to 1989-90	4.8	5.6	2.7	3.5
1981-82 to 1989-90	4.4	5.2	2.3	3.1

During the State's Seventh Plan period, the number of junior basic schools was 63695 in 1973-74. It increased by 14.5 percent to 72959 in 1984-85 and by 1.8% to 74275 in 1989-90. The number of senior basic schools also recorded an increase of 45.0% during 1974-85 when it moved up from 10076 (1973-74) to 14614 (1984-85) but it declined marginally to 14549 in 1989-90. Growth of student enrolment in higher education was 3.7% and one university was opened and another institution was given the status of deemed university. 15 new degree colleges were given recognition. Literacy percentage did not make much headway in the Seventh Plan period.

At the time of Independence, U.P. had 5 universities and 16 degree colleges. At the beginning of the Eighth Plan, it has 2 central universities, 13 general education state universities, 3 state agricultural universities, one state engineering university, one Sanskrit university, 4 institutions deemed to be universities, one institution established under state legislature act, one I.I.T., and one institute of management. There is no open university in the state although IGNOU has several study centres in U.P. There is also no women's university in the state.

UGC Schemes

The details of departments supported by the UGC under its specialised schemes are as follows :

COSIST

Physics	BHU, Roorkee, AMU, Allahabad
Chemistry	Gorakhpur, BHU
Life Sciences & Bio-Sciences	BHU, Lucknow
Earth Sciences	Kumaun, Roorkee, BHU
Mathematics	Allahabad
Engineering	Roorkee, BHU

Centres of Advanced Study (CAS) in Humanities and Social Sciences

History	AMU
Psychology	Allahabad

Departments of Special Assistance (DSA) in Humanities and Social Sciences

Commerce	AMU, Allahabad, BHU
Ancient History	Allahabad, BHU
Philosophy	BHU, Allahabad
Sociology	BHU
Psychology	Gorakhpur
Arabic	AMU
Hindi	Allahabad
Mass Communication and Journalism	BHU
Music	BHU
Anthropology	Lucknow
History	HN Bahuguna
Social Work	Lucknow

CAS in Sciences, Engineering and Technology

Botany	BHU
Met Engineering	BHU
Zoology	BHU
Electronics	BHU
Physics	BHU
Mining Engineering	BHU
Mech & Industrial Engineering	Roorkee
Molecular Biology	BHU

DSA in Sciences, Engineering & Technology

Biochemistry	Lucknow
Chemistry	Allahabad, BHU
Geography	AMU, BHU
Botany	Lucknow, Allahabad
Earth Sciences	Roorkee
Physics	Roorkee, AMU, Allahabad, Kumaun
Civil Engineering	Roorkee
Earthquake Engineering	Roorkee
Ceramic Engineering	BHU
Geology	Lucknow, Kumaun
Electrical Engineering	BHU
Mathematics	Allahabad, Roorkee
Departmental Research Support	
Zoology	AMU
Chemistry	Gorakhpur
Electrical	Roorkee
Metallurgical	Roorkee
Geology	BHU
U.G.C. Curriculum Development Centres	
Earth Sciences	Roorkee
Commerce	Allahabad
Plastic Arts	BHU
Hindi	BHU
Urdu	AMU
Hi-Tech and R&D Areas	
Biotechnology	BHU
Ocean Science	Nil
Atmospheric Sciences	Nil
Mass Communication Media Centre	Roorkee
Race to Save the Planet	Nil
Film Study	Nil
Third World Studies	Nil
Future Studies	Nil
Centre for Regional Studies	Nil

Centre for Women's Studies	Nil
Cells for Women's Studies	Kanpur, Muzaffarnagar, Meerut, Akbarpur
Science Education Centre	Nil
USIC	Nil

It would be noted from the above that the major UGC grants have been netted by the two central universities and a very few state universities.

Higher Education in the Eighth Plan

The U.P.'s Eighth Plan envisages the following objectives with regard to higher education :

- i) existing degree colleges be strengthened,
- ii) new colleges be established in unserved backward areas,
- iii) implementation of three year degree courses,
- iv) greater emphasis on provision for women's education, and
- v) under youth welfare programmes, greater emphasis be given to NCC than to NSS.

The strategy to be adopted for the Eighth Plan to implement the above objectives has been enumerated as follows :

- a) Except for a few, most of the Govt degree colleges do not have their own buildings and some of them do not have even their own land for construction of buildings although they have been running for quite sometime. Therefore, the first priority would be given to provision of land and building for such institutions;
- b) Regional balance in higher education would be established by preferential treatment for unserved backward areas;
- c) Although three year degree courses have been introduced by all the universities in the state during the Seventh Plan period, necessary and adequate infrastructure could not be developed for the purpose. It has been proposed to provide posts and funds for additional classrooms, library, equipment, etc. for such colleges and universities; and
- d) The state Government has decided not to open any new degree college under Govt. sector in the Eighth Plan and if opening of new colleges becomes unavoidable then such new colleges would be opened in private sector. However, it would require the Govt. to bring unaided degree colleges under grants-in-aid list for the purpose of salary payment.

Plan Outlay for 1992 - 97 and for the yearly plan of 1992-93 (Rs in lakhs)

Major/Minor Head of Development	Eighth Plan (1992 - 97)			Annual Plan (1992-93)		
	Total	Hill	Capital Content	Total	Hill	Capital Content
Education						
Higher Education Administration	190215.0	32375.0	38873.26	24548.38	4569.50	5420.01
Universities	22730.45	4174.95	17975.00	3042.09	341.89	2140.00
Govt. Colleges	751.88	100.00	350.00	225.35	50.00	125.00
Non-Govt. Colleges	11795.00	445.00	10625.00	1235.00	40.00	1050.00
Institute of Higher Learning	8195.99	3309.60	7000.00	1135.02	234.55	965.00
Other Expenditure	1058.23	64.38	0.00	177.97	2.25	0.00
Break-up Figures	565.00	0.00	0.00	233.00	0.00	0.00
Development Grant to Universities	364.45	255.97	0.00	35.75	15.09	0.00
Second Campus of Lucknow University	1070.00	445.00	-	165.00	40.00	-
Dev. Grant to BRA University	625.00	0.00	-	50.00	0.00	-
Implementation of T.D.C.	1000.00	0.00	-	1000.0	0.00	-
Construction of Library building of Gurukul K. Univ.	0.00	0.00	-	0.00	0.00	-
Opening of New Govt. Degree Colleges	3390.00	1370.36	-	143.87	50.00	-
Strengthening of existing Govt. degree colleges	406.09	214.44	-	61.63	46.63	-
UGC matching share to Govt Colleges	100.0	50.00	-	15.00	5.00	-
Construction of Buildings of Govt. Colleges	2795.00	625.00	-	748.00	48.00	-
Electrification of Govt. Colleges	25.00	25.00	-	1.00	1.00	-
Teaching and Non-Teaching Residences for Govt. Colleges	250.00	250.00	-	20.00	20.00	-
Construction for Hostel Building for Govt. Colleges	460.00	460.00	-	50.00	50.00	-
Purchase of land for Govt. Colleges	75.00	25.00	-	10.00	5.00	-
Provisions of Petty Works in Govt Colleges	75.00	25.00	-	12.00	2.00	-
Construction of Library Building of Govt. College, Pithoragarh	4.00	4.00	-	0.50	0.50	-
Provision of Land in Govt. Colleges	0.80	0.80	-	0.20	0.20	-

Private Colleges						
U.G.C. matching share to Private Colleges	155.00	5.00	-	31.00	1.00	-
Introduction of new faculties and new subjects	129.38	59.38	-	11.25	1.25	-
Non-aided private Colleges to grants-in-aid	176.84	0.00	-	45.72	0.00	-
Implementation of T.D.C.	492.01	0.00	-	70.00	0.00	-
Non recurring grants to various non-govt. colleges	0.00	0.00	-	0.00	0.00	-
For participation in conferences/seminars	10.00	0.00	-	2.00	0.00	-
Establishment of University Education Commission	0.00	-	-	-	-	-
Teaching through television	5.00	5.00	-	1.00	1.00	-
Rent of building of IGNOU Regional Office	24.00	-	-	4.80	-	-
Establishment of Coaching Centre for competitive exam for poor (Other than minorities & SC/ST)	5.00	5.00	-	1.00	1.00	-
Incentive grants to colleges	35.00	10.00	-	5.50	0.50	-
Establishment of autonomous colleges	10.00	0.00	-	2.00	-	-

These figures reveal that the State Govt. has not allocated the funds proportionate to the responsibilities shared by private degree colleges. A small sum has been provided for the creation of posts and infrastructure due to implementation of three year degree courses. A mismatch to this is the provision for 100 crores for the proposed new university at Lucknow and an outlay of Rs. 625 lakhs for the second campus of Lucknow University. It is surprising that a total sum of Rs. 70 lakhs has only been provided in 1992-93 for implementation of three year degree courses in private degree colleges which number nearly 400, while Rs. 50 lakhs are allocated for 1992-93 for the second campus of Lucknow University. No provision for incentive grants to private colleges has been provided in the Eighth Plan. Only a small sum of Rs. 5 lakhs have been provided for the total plan period for teaching through television while no provision has been made for an open university in the state. No attempt seems to have been made to improve education in private colleges through the grant of status of autonomous colleges in U.P. as only 5 colleges are proposed to be given that status during the entire plan period with only one in 1992-93 and one in 1993-94.

The scenario reflects very serious mismatch between objectives and grants outflow. While education is considered an important and effective instrument of human

resource development and is seen as one of the major pre-requisites for economic growth and national progress the proposed financial investment is in tune with the requirements. Higher education in India is largely funded from public exchequer and for this reason alone, it should strive for regional balance between universities and colleges and between Govt. Colleges and private colleges.

Anneexure

List of Universities and University Level Institutions in U.P. (with the year of establishment in brackets)

i) *Central Universities*

BHU (1916), AMU (1921)

ii) *General Education State Universities*

Allahabad (1887), Lucknow (1922), Agra (1927), Gorakhpur (1957), Kanpur (1965), Meerut (1965), Kumaun (1973), H.N. Bahuguna (1973), Kashi Vidyapeeth (1974), Avadh (1975), Bundelkhand (1975), Rohilkhand (1975), Poorvanchal (1981).

iii) *State Agricultural Universities*

G.B. Pant (1960), Acharya Narendra Dev (1974), C.S. Azad (1974).

iv) *Engineering Universities*

Roorkee (1949).

v) *Sanskrit Universities*

Sampurnanand Sanskrit (1958)

vi) *Institutions deemed to be Universities*

Gurukul Kangri (1962), Dayalbagh (1981), IVRI (1963), CIH Tibetan (1989)

vii) *Institution established under State Legislature Act*

Sanjay Gandhi PG (1983)

viii) *Others*

a) Indian Institute of Technology, Kanpur

b) Institute of Management, Lucknow

c) Regional Office of IGNOU, Lucknow

d) Forest Research Institute, Dehradun

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Science As A Fine Art

Cochin University of Science and Technology held a Special Convocation to confer its first honorary degree of Doctor of Science on the eminent Scientist, Dr. E.C.G. Sudarshan in appreciation of his outstanding original and significant contributions to science, and particularly to theoretical physics. Dr. Sudarshan in his address observed, "I would like to share with you my conviction, after four decades of being a scientist, that science is akin to fine arts. Both involve high discipline, painstaking preparation, glorious insight and a deep gratitude for the richness of the universe that enables to find enjoyment and share it with others."

Excerpts

The Nature of Science

Every day every one interacts with universe. This experienced universe reveals more of its structure and configuration, the more disciplined and systematic the act of observation is. It is convenient to find the common domain of our experience and identify it with our objective reality independent of any specific observer, or the time, orientation, location and inertial motion of the observers. Physical sciences concern themselves with this external objective observed universe. Science is the disciplined, refined perception of the universe and its ordering into laws and theoretical structures.

It is clear that physical sciences utilize the pooled experiences and discoveries of all scientists and is thus a social activity. The discovery by one scientist is not only his, but of the commonwealth of sciences. The observations of the universe include insights as much as meter readings or sense data. The theoretical aspects of science modify our perception in that we see that which we could have seen, but did not discern.

Methodology of Science

Much of the work of discovery in sciences is the result of controlled experiment. In a controlled experi-

ment, the relevant subsystem of the universe is identified and as much as possible, isolated. Such means as high vacuum, electrical and magnetic shielding and efforts to isolate mechanical disturbances are some of the methods of control. In cases where one deals with uncontrollable effects like gravitation or thermal contact, we try to allow for these by a few isolated parameters. The design of an experiment involves in an essential sense the separation of the universe into the experimental system and the outside world. In the latter we can control the events to our liking while inside the experimental system everything is according to rigid physical law. Needless to say, experimental design is a learning experience and involves systematically our scientific world view. The experimental system is causal; but the outside world, including the observer, has a limited amount of autonomy in that we can choose to do an experiment with the choice of initial conditions. We could oversimplify this and state somewhat inaccurately that we have the freedom to set up the experiment, but nature decides the subsequent events.

Physical Law : World as Process

The purpose of experimentation in science is to discover physical laws - these are the invariant cor-

relations between the relevant initial conditions and the final configuration. The physical law thus refers to the abstract correspondence and does not refer to any initial condition. To describe any concrete evolution of a system, we need to specify both physical laws and the initial conditions. The physical law is like a familiar play, say, "Hamlet", while any actual motion is like a performance with a particular cast at a particular time and place.

This breaking up of the world into an experimental system and the background, and the subsequent breaking up of a specific process into the physical law and the initial conditions enables us to recognize the greater degree of symmetry for the physical law. General principles like the principle of relativity are best expressed in terms of the physical laws rather than the physical events that are directly observed. For some decades we have known that conservation laws of physics (like the conservation of energy, of electric charge, of momentum and of angular momentum) can be related to symmetries of the fundamental laws. In the more ambitious theories it is the symmetry that decides the physical law and hence the physical model. The best known example is the general theory of relativity where the requirement that the laws should be unchanged under general coordinate transformations suggest that the laws are expressed by the tensor relationships; together with the correspondence with Newtonian gravitation these tensor equations furnish the specific law of general relativity and even of relativistic cosmology.

This emphasis on the dynamical law urges us to view the world as a flow than as a configuration. The substance (or, more generally, the configuration) is the carrier of the flow. The world is a process, not stuff! Our world view is thus dramati-

cally changed, from watching the actors to enjoying the play : from stuff to flow. Flow is manifested by the stuff, like the play is performed by the players. The adept viewer is able to "see the play" as well as the enactment.

Science as a Social Activity

Science is a commonwealth of knowledge and as such the results of refined careful experimentation and theory building should be communicable and communicated. Science is not merely personal knowledge but is a social activity. It is the communicated and recognized discovery that is science. Of course, if we insisted on communication in common parlance, it would limit the abstraction that can be communicated. So common language gets extended by carefully chosen new imageries, and a technical language gets formed to facilitate the communication. This new language contains much of mathematics, some of it quite abstruse. Thus, while the technical-mathematical language facilitates scientific communication, it erects some barriers from ordinary people. Unless carefully done, popularizations distort and obscure science rather than illuminate it.

Does Science Have a Purpose?

What is the purpose of science? Since science involves the refined perception of the world and communicating it to others, science is not only for the individual scientist's enjoyment. In this it is very close in spirit to fine art where everyday actions and observations are refined to the point that it is a separate reality : yet this almost separate reality is a finer appreciation and is a powerful mode of perception. The fulfilment of science is in the twin actions of enjoyment of the controlled refined perception as well as its creative communication.

One of the side benefits of science is the application of science to technology to make us fashion new tools as well as to utilize natural

processes for the achievement of technical objectives. Natural law provides the constraints on physical processes much as the body of the flute and its stops constrain the air flow; yet it is this set of constraints which obtain the sweet notes of the flute. The creativity in technology is in seeing what can be done to use the constrained processes of nature to fashion the desired functionality. It may be compared to commercial art or to anatomical sculpture in medical education, in its relation to the fine arts of painting and sculpture.

Like in the fine arts in science, too, we tend to expand, and expand on, some aspects of natural law. In studying photo-electric effect we need a superclear metal surface with light of well-defined frequency and study of the electrons emitted from the metal surface irradiated with light. In "Hamlet" we take a commonplace circumstance in a disturbed young man's life and study the psychodrama that dominates the life of many people. The simplest mechanics idealize the motion of pebbles and ripples where commuting real numbers control the description. This is like the simplest music rhythm that punctuates and ornaments a song. When mechanics is extended to the subatomic domain, we have to use quantum theory with its noncommuting quantities like the use of a complex melody which is to simple rhythm as classical physics is to quantum physics. And just as music in its acme leaves all thought of its structure and word meaning, so does physical theory in its zenith appears to relate to purely abstract constructs. But just as complex musical melodies can be communicated to a select few, but be appreciated by many, the most abstruse physical theory is grasped by the select few but many more appreciate it and use it.

There are many sculptors and sculptures but Rodin's "Thinker", for example, has evoked a universal recognition in people of many cultures. In the same way some scientific theories like the theory of relativity of Einstein and Poincaré

has evoked universal admiration, and in it people of many other disciplines find echoes for their own disciplines.

Not everyone that enjoys music can become a creative musician or a concert musician. Nor do we think that people should all be taught music. But we do feel that music appreciation should be encouraged. Further that a creative musician, like a scientist, should be supported by society at large and continue to produce music. The concert musician who performs the music to the people at large should be rewarded; and so also the technologist who applies the sciences to needs of society as perceived by the technologist. The performing musician may be more readily recognized and applauded and perhaps rewarded by society. But behind and antecedent is the creative musician who is the root from which the performing musician is the branch that provides the fruit. To reap the fruit we must nourish the root, in the language of Peter Sellers in his role as Mr. Chauncey Gardner in the movie "The Way Things Were". There is also the felicitous metaphor of the aswatha tree in the eighteenth chapter of Bhagavad Geeta where the tree has branches below and roots above !

Critics of Science

It surprises me somewhat when students complain that physics is difficult, that physics is uninteresting, that physics has not much relation to life. What could be more relevant or more interesting? A smaller number complain similarly about chemistry or the life sciences. But to me it is like someone asking : What is the use of fine art, why devote many years of a person's life of mastery in one area? They say : What is the relevance of dance, music or sculpture in a world full of strife, scarcity and suffering?

Even more surprising and somewhat disappointing are more sophisticated critics who charge

that science is dehumanizing us and that science, by way of technology, is polluting the world and filling it with weapons of destruction. The written word and methods of modern communication have caused most of the fanatic destructiveness : but, does that warrant blaming the written word or techniques of mass communication? Does abandoning the comfort of modern technological civilization restore us to harmony? Do not these same critics use the fruits and the methods of science to propagate their own world view? A sharp knife in the hands of a surgeon can do great good but it can also be used as a weapon of destruction.

Some degree of confusion exists in the public about the separate nature of science and of technology. In science the value is in ever-expanding discovery, insight and experimentation. Reproducibility is needed and is crucial but is the improved repetition and reliability that is of value. Technology comes into its own when it creates wealth, con-

venience and comfort; if it fails to do these it is only in its beginning. This is true whether it is the bullock cart or nuclear energy. Technology is highly visible both because it is extensive and because its end-users are the public. This contrasts with science where the work is not very visible and not necessarily critically appreciated by the public. It is easy for those in charge of technology to claim to be scientists and having taken on the disguise of a scientist, go on to appropriate not only its resources but also its representation to the public. In such cases the public often blames the ills of ill-managed technology on science.

Epilogue

What are the goals of life? Why do we toil and trouble ourselves: it is to enjoy, to know, to observe to be free. Fine arts are an expression of these goals of life. What we enjoy alters us; and we seek the enjoyment that endures. What we see at first is not the final vision; greater skill and

maturity enable us to penetrate appearances to cognize a deeper reality. The act of observation is shallow without critique, and the more refined our observation and the more it is supplemented by its context in the scheme of things, the better our observation. The real is hidden from the undeserving, the undisciplined. True freedom comes not from a disregard of the constraints but by skillful obedience to the constraints. Art illuminates and empowers us; so does science. It is my belief that Narayana Bhattatiri's invocatory hymn :

*Sandrandavabodhatmik amanapaman
kaladesavadibhyam nirmuktam-nityanuktam
nigamasatasahasrena nirbhasya manam
aspastam drsyamatre punaruru purusartatmakam
brahmatatvam tattavad bhati saksat.....*
is most appropriate of deep cognition whether in science or in fine art.

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Anna Varsity Convocation

The Special Adviser to the President of the World Bank, Mr. V. Rajagopalan, complimented the Central Government for initiating a 'major transformation of development strategy' and liberalising industrial, trade and financial policy changes in what was once a closed and regulated economy in the world. He was delivering the address at the 13th convocation of the Anna University. He said the reform agenda ahead remained formidable and difficult policy changes were yet to be implemented. However, what was accomplished in the past 10 months was impressive, and if this pace was maintained over the next three or four years, 'India could become one of the world's most dynamic economies during the second half of the 1990s and beyond.'

Mr. Rajagopalan, who is also a Vice President of the World Bank, said there had been a marked change in the basic approach to development sweeping the world now. While Governmental decision making was still important, the stress now was on providing an enabling environment where people could do more to better themselves rather than expect the Government to address all problems.

Competition brought enormous benefits in terms of efficiency and to forego these would "sentence India to continued mediocre economic performance and low living standards," he said. The shift now was from a supply-driven orientation to demand-driven one, he said, stressing four issues - productivity growth, foreign innovations, infrastructure, and local financing support for entrepreneurs.

Elaborating on these, Mr. Rajagopalan said India attracted relative-

ly small amounts of direct foreign investment and the contrast to China was striking. Japanese technological success had depended critically on their being open to ideas developed elsewhere, and "it is such openness that we need to cultivate now".

Engineers and scientists had an important role to play in defining a national vision, in educating the public and decision makers, and in working with professionals in other disciplines to create cost-effective mechanisms for realising this vision. The professional ought to earn a seat at the policy making table. Any improvement of efficiency and quality should come not only from the students but also from their teachers. "Good teachers are always good students. They never stop learning". It is the teacher who can bring the excitement and the challenges of the real world to the classroom." A partnership of teachers, students, and the various productive units in our economy is our best hope for sustained progress", he added.

In his report, Dr. M. Ananda-Krishnan, Vice-Chancellor, referred to the achievements of the university during the past year and said that with 873 women students out of a total of 5221, the Anna University had the largest number of women studying engineering and technology courses in the country.

The degree of Doctor of Science (*honoris causa*) was conferred on Mr. V. Rajagopalan and also Mr. P. Sivalingam, the first Vice-Chancellor of the university. The Governor and Chancellor of the University, Mr. Bhishma Narain Singh, presided over the convocation in which the Education Minister and Pro-Chan-

cellor, Dr. C. Aranganayagam, participated. A total of 690 candidates in person and 1713 in absentia took their degrees at the convocation and this included 33 who took their Ph.D. degrees.

'Exploration in Poe' Released

Well-equipped libraries and sophisticated laboratories are, no doubt, necessary for ensuring quality in research and advanced studies, but inadequacy of these facilities need not discourage academicians from engaging themselves in meaningful research", said Dr. K. Jayashankar, Vice-Chancellor of Kakatiya University. He was releasing a book on 'Exploration in Poe' written by Dr. D. Ramakrishna, Reader in English of the Kakatiya University in Warangal recently.

Expressing concern over the deteriorating standards in research, Dr. Jayashankar observed that most of the research activity in the universities had become repetitive and degree oriented rather than original and innovative.

He paid compliments to the teachers and researchers at the university who were making best use of the facilities available, however limited they might be. The Vice-Chancellor assured the faculty all possible support and encouragement in every effort aimed at qualitative transformation of research programmes at the university.

P.G. Course in Forensic Engg

A P G Diploma Course in forensic engineering has been introduced in the Anna University. According to the Director of the Forensic Sciences Department, Prof. P. Chandrasekharan, 20 students had been admitted to the course which commenced a month ago. The law of

ences and the law of contract had been included as subjects. Graduates in engineering and architecture were eligible for admission.

It is the application of the art and science of engineering in the jurisprudence system, requiring the services of legally qualified professional engineers. This branch of science may include investigation of the physical causes of accidents, claims and litigation, preparation of engineering reports, testimony of hearings and trials in administrative or judicial proceedings and offering of advisory opinions to assist in resolution of disputes affecting life or property.

The discipline started developing in the Western countries about a decade ago. Citing an instance, Prof. Chandrashekharan said a U.S. court had accepted the opinion given by forensic engineers that the position of a road in a hilly area was responsible for an abnormal increase in the groundwater level, resulting in damage to structures.

Engg. College Convocation

Delivering the Convocation address at the Dr. MGR Engineering College at Maduravoyal, near Madras, the Tamil Nadu Education Minister, Mr C. Aranganayagam, said that the managements of self-financing professional colleges should use the funds got from students to improve facilities. This was what the Government expected of the self-financing institutions and such a move would also prevent criticism from the public.

Tracing the growth of self-financing professional colleges in the State, Mr. Aranganayagam assured them that the Government would not harass or punish them. He administered a pledge and gave away degrees to students.

Dr. S. Sathish, Vice-Chancellor, Madras University, who presided, said a number of self-financing

professional colleges in the State had achieved good growth in the last few years.

Dr. T.R. Natesan, Director of Technical Education, said the increase in the number of professional colleges had helped in promoting entrepreneurial skills among youth.

In his report, Dr. V. Srinivasa Gopalan, Principal, said of the 136 students who appeared in the May 1992 examinations, 104 took their degrees. Eighty five secured first class. Three students had secured university ranks.

Promoting Urdu Publishing

The Afro-Asian Book Council (AABC), New Delhi recently participated in the 7th Lahore International Book Fair. It exhibited 170 books published by its members.

During the course of fair meetings were held between the representatives of the book industry in Pakistan and Chemicals and Allied Products Export Promotion Council of India (CAPEXIL). The following broad understandings were reached :

1. AABC will initiate a structured dialogue with Lahore Booksellers and Publishers Association, Urdu Publishers from Pakistan, All India Urdu Publishers Association, CAPEXIL and Federation of Publishers and Booksellers Associations in India, which would help in strengthening Urdu publishing in the region through mutual cooperation. This dialogue will also explore ways in which free flow of information within the South Asian region can be promoted.

2. AABC will organise in Pakistan an author development workshop on the lines of the successful workshop it had organised in Lahore in April 1992.

3. Mr Salim Malik, convenor of the Fair, will explore the possibility of establishing a chapter of the Council in Lahore.

The AABC exhibit at the Fair received a very encouraging response. Visitors were impressed by the quality of books being published by the Council members. The visitors were also pleased to see the effort being put in by AABC to promote intellectual self-reliance in the Afro-Asian region.

As a consequence of the discussion held in the meeting in Lahore, the representatives of the Council met in New Delhi with the office-bearers of the All India Urdu Publishers and Booksellers Association and Anjuman Tarraqi Urdu (Hiad) in which the *modus operandi* of organising an Indo-Pak Urdu Conference and an Urdu book exhibition was discussed. It was decided that the two events be organized under the auspices of the AABC with cooperation from concerned organisations in India and Pakistan. It was also agreed that a Good Offices Committee comprising the representatives of the publishing community in the two countries be set up to strengthen the ties between the publishers of the sub-continent and to remove bottlenecks through mutual consultation.

Osmania University Convocation

The Vice-President, Mr K.R. Narayanan called for a more intelligent and healthy participation by students in the national political process. He was delivering the 69th convocation address of Osmania University at Hyderabad recently. The Vice-President said students should take greater interest in social activities, including politics, so as to bring about a real transformation in the country. "If you are not to be ruled by the people who are inferior to you, it is important for you to

participate in politics, which should be without violence and causing destruction to the academic process," he said.

Laying emphasis on scientific education which provides solution to many problems plaguing the society, Mr. Narayanan said science had to be pursued and its application should be intended for the good of the society. He said the stress during the last 40 years after Independence was on scientific education and now technology needed to be vigorously pursued.

Making a fervent appeal to the youth to uphold the tradition of tolerance as preached by the *gurus*, he said, "it is in the universities that the solutions for most problems the country is facing today lay." He urged the students to set an example to the elders who had not been able to translate into reality the teachings of the *gurus*, for the creation of a new India of the 'classical type'.

Quoting Jawaharlal Nehru, Mr Narayanan said universities should not become houses of 'narrow bigotry'. He said, sadly the country was departing from broad liberalism encompassing tolerance and mutual respect for each other.

The Governor, Mr Krishan Kant, who is also the Chancellor of the University, awarded the honorary doctorates to Mr Vittal and Prof. Ram Reddy. He awarded Ph.Ds to 640 candidates and gold medals in M.Phil and postgraduate courses during 1990-91 and 1991-92.

The Vice-Chancellor, Prof. M. Malla Reddy in his report said the university had introduced many innovative courses like Instrumentation in B.E., Electronic Warfare in B.Tech., Food Technology and Pharmacy. As a centre for the pursuit of excellence, Osmania had also been attracting a number of foreign students, he said, adding that such explosion of student population had created a new challenge.

Workshop on Forestry Course Curriculum

A two-day National Workshop on Forestry Course Curriculum was recently organised by the Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni to review the course curriculum of forestry education. Sponsored by the Indian Council of Agricultural Research (ICAR), the workshop was inaugurated by Dr. B. R. Sharma, Vice-Chancellor of the host University. In his address Dr Sharma called upon the scientists to review the course curriculum of forestry education according to the requirements of the society. He added that today forestry education and research was very important specially when the sword of ecological imbalance was hanging over the world due to increasing population and heavy industrialisation. He called this occasion a historical moment in the history of forestry education and research when the scientific community from all over India had assembled to review the courses of forestry education. Dr. Sharma who chaired the first technical session said that the real aim of education could not be fulfilled without developing the communication skill, knowledge skill, reasoning ability, application and job oriented ability amongst the students.

Dr. P. L. Gautam, Dean College of Forestry, said that the forestry education was started in Europe during 1785, USA 1862 and in India 1867. He said that Y.S. Parmar University had played a lead role to start M.Sc Forestry in 1976 and Ph.D. in 1983. University also started MS Agro Forestry from this session. He added that presently 11 universities of the country were providing B.Sc. Forestry degrees to the students.

During the course of deliberations it was felt that uniformity in

syllabus and grading formula was a must. Extensive training and practical knowledge was required in forestry education to make a person fully equipped. Instead of opening new institutions there must be an accreditation system for the existing institutions whether they be fully equipped to provide the quality education or not. If not they should not be allowed to produce the unskilled manpower but good institutions should be strengthened. "We must know the professional requirements for which manpower planning cell should be opened. Duration of the course should be 4 years. Physical training for the protection from animals is needed. Eco philosophy under new education should be introduced in the course. Vocational course must be included to make the forestry education job oriented and more professional" he said.

One hundred scientists from various parts of the country including Padma Shri Dr. K. N. Tiwari, Ex President, Forest Research Institute, Dehradun, Dr. V. Ganaprasam, Vice-Chancellor, Tamil Nadu Veterinary and Animal Sciences University, Madras, Dr. S. Chinnamani, Asst. Director General (Agroforestry), ICAR participated in the workshop.

Private Enterprise & Farm Research

The World Bank Vice-President, Mr V. Rajagopalan, said that India would have to involve its private sector in agricultural research and education to meet the long-term farming and food needs of the country. He was delivering the 24th Lal Bahadur Shastri Memorial lecture at the Indian Agricultural Research Institute in New Delhi

recently. He said agricultural research and technologies, currently generated almost exclusively by institution in the Government sector, were not cost-effective.

Mr Rajagopalan, who is also the chairman of the Consultative Group on International Agricultural Research, that manages global institutions like the International Rice Research Institute at Manila, was of the view that the private sector could make farm research cost-effective. He felt that it was time for the Indian Government to examine how the agricultural research system in the country could be 'consolidated' to produce centres of excellence.

He did not visualize finalization of a firm research policy right now. Rather, he said, he would look forward to the Government chartering 'the broad parameters of change in a tentative manner'.

Mr Rajagopalan said the future demands on the agricultural system in the country would change on the basis of the consumption patterns weighed heavily in favour of high-value crops.

Pulse Day at MPKV

"In order to increase the production of pulses the farmers need to be trained in pulse production technology. The pulses require less irrigation, and give better yields. These crops improve soil fertility. Therefore farmers should grow pulses," said Shri Shankaraoji Kale, Member of Parliament, on the occasion of pulse day organised at the Mahatma Phule Krishi Vidyapeeth, Rahuri. There was an urgent need to organize training programme on pulse production technology for the benefit of farmers, he added. The programme was organized as part of National Pulse Improvement Project of the University. Dr. S.K. Dorge, Vice-Chancellor of MPKV, who presided, said that research

programmes of the Mahatma Phule University were based upon the needs of the farmers. He exhorted the scientists & farmers to reduce the cost of cultivation by following appropriate management practices.

On this occasion Shri Suresh Patil, Executive Member of MPKV, released a folder on black gram (Udid TPU-4) and another folder on Bean (HPR-35). Pulse breeder Dr. R.B. Deshmukh reviewed the pulse research carried out by the University and emphasised that the production and productivity of Gram and Arhar had increased. In order to keep the increasing trends of pulses production it was necessary to adopt the improved varieties of pulses, he added. Shri Jayant Deshmukh, Principal Agricultural Officer, Ahmednagar urged that adequate credit facilities, should be provided for growing pulses. On the occasion progressive farmers from various parts of the state narrated their experiences. They said that farmers must take rotation crops of pulses and should frequently visit the University for getting information. The farmers should adopt the varieties evolved by the university because these require less irrigation. They appealed to the University scientists provide guidance to farmers on different crops.

New Crop Varieties Developed at HAU

To develop economically viable and technical feasible technology for increasing the production of different crops under various agro-climatic conditions of the state, the Chaudhary Charan Singh Haryana Agricultural University has introduced a new research scheme under which the experts have evolved several high yielding, early maturing and disease resistant varieties of pulses and oilseed crops.

According to the Vice-Chancellor, Dr A.L. Chaudhry, the newly

developed varieties include RH-781 of mustard, RH 8113 and 819 of Raya, Haryana Channa No. 1 and HG 86-143 of gram have been found very popular among the farmers of the state because of their extra soil salinity and frost resistant qualities as well. Among the other varieties, bajra hybrid HHB-67 and HHO-68, basmati rice, HKR-120 have also been found equally suitable for the different agro-climatic areas of the state. These varieties are equally suitable for the wheat and rice crop rotation.

Keeping in view the importance of researches for the overall prosperity of the state, the University has enhanced the budget allocations as well. Presently, a total number of 375 research projects are in operation at the university for which an amount of 40 percent of the total budget of the university has been earmarked.

Dr. Chaudhry said that a Biotechnology Centre had been established at the university to give due attention to the enhancement of production of fruits, vegetables and livestock production in the state. In this centre, the scientists are engaged in identifying the unnatural ways and means like tissue culture and embryo transfer techniques etc. for increasing the production at desired level.

We Congratulate

Dr. Kirti Singh who has taken over as Vice-Chancellor of the Indira Gandhi Krishi Vishwavidyalaya, Raipur.

Countrywide Classroom Programme

Between 22nd March to 31st March, 1993 the following schedule of telecast on higher education through INSAT-1D under the auspices of the University Grants Commission will be observed. The programme is presented in two sets of one hour duration each every day from 1.00 p.m. to 2.00 p.m. and 4.00 p.m. to 5.00 p.m. The programme is available on the TV Network throughout the country.

1st Transmission

1.00 p.m. to 2.00 p.m.

22.3.93

"Liquid Crystals-I"

"Management Functions and Behaviour : Decision Making

23.3.93

"Black Diamond – Buckminster Fullerene"

"Ways of Thinking – III. World of Waves"

"Reconstructive Microsurgery"

24.3.93

"Conservation of Indian Fruit Bats"

"Microbiology of Milk – I"

"Eyes in the Sky – Remote Sensing-III"

25.3.93

No Telecast

26.3.93

"Communicating Skill : Story Telling – I"

"The Dying Dal Lake"

"Career Counselling – I The Humanities and Social Sciences"

"Zero Gravity Caravelle"

27.3.93

"Glorious Past, Uncertain Future"

"The Pursuit"

"Week Ahead"

28.3.93

No Telecast

29.3.93

"Liquid Crystals – II"

"Management Functions and Behaviour : Leadership Styles"

"Wonder Working Light"

30.3.93

"Flocculation"

"Ways of Thinking – IV Spheres of Sound"

"Uses of Isotopes in Nutrition"

31.3.93

"Wonder World of Cells – I"

"Microbiology of Milk – II"

"Remote Sensing and Development"

2nd Transmission

4.00 p.m. to 5.00 p.m.

22.3.93

"Origins of Quantum Theory : From Planck to Bose – I Max Planck"

"Of Figures And Columns : The World of Chartered Accountants – II"

"Pen Pals"

23.3.93

No Telecast

24.3.93

"Vampire Bat"

"Soil Mechanics In Practice"

"Questioning Rock Art"

25.3.93

No Telecast

26.3.93

"Glorious Past, Uncertain Future"

"The Pursuit"

"The Week Ahead"

27.3.93

No Telecast

28.3.93

No Telecast

29.3.93

"Origins of Quantum Theory : From Planck to Bose – II

Albert Einstein"

"Small Steps To Big Gain"

"Vermicompost-I, The Might Of The Small"

30.3.93

No Telecast

31.3.93

"Unveiling Antarctica"

"Trends In Brain Research"

"Hypotherapy – Medical Uses of Hypnotism – II"

Privatise Oxford

Oxford should go private to safeguard academic autonomy from Government interference and "bureaucratic tutelage", says Nevil Johnson, professorial fellow of Nuffield College, Oxford and up to 12 more of Britain's top universities, could improve their destiny by withdrawing from the Higher Education Funding Council (HEFC) for England and increasing their income by doubling the student fee, he adds.

The controversial privatisation theory has been suggested tentatively before, but Mr Johnson sets out in detail how it could be made to work financially for Oxford.

The university currently receives public funding totalling £120 million including £65 from the HEFC grant, £25 million from university fees and £30 million from colleges fees.

But the immediate financial cost of independence would be only about £80 million, assuming the university would continue to receive half of its college fee income from public support, he says.

This could be found by doubling the fees charge, yielding an additional £70 million. Further funds could be raised from private donors and by examining the current financial relationships between colleges - the main holders of accumulated wealth - and the university.

Brilliant students unable to pay the substantial fee increase would be helped by scholarships which the university would invest in developing. Mr Johnson said : "We have quite a lot of clever applicants from families who have been able to send them to the best public schools.

Many could continue to pay those fees."

Independence would offer the university freedom to manage its own affairs according to its own values, and would release it from "external bureaucratic demands" and "manipulative conditions" associated with state funding.

He writes : "Academic freedom - and therefore, ultimately, academic standards and intellectual achievement - are exposed to serious threats in Britain.... primarily from totally misconceived policies which treat universities like industrial production units."

A spokesman for the university said : "The autonomy argument is a strong one but it would be a very different kind of Oxford and need a considerable rethinking of priorities."

UN University HQ Inaugurated

United Nations Secretary-General Mr Boutros Boutros-Ghali, recently inaugurated the new per-

manent headquarters of the United Nations University (UNU) in Tokyo. The construction of the UNU headquarters building by the government of Japan was completed in 1992.

The UNU was established with the approval of its charter by the UN General Assembly in December 1973 to be an international community of scholars engaged in research, advanced training and the dissemination of knowledge related to the pressing global problems of survival, development and welfare.

It also has research and training centres in Helsinki, Maastricht and Macau. Another is to be located in Accra. An Institute of Advanced Studies to be located in Tokyo and another research and training centre in Barcelona are in final stages of preparation.

The UNU also has major research and training programmes in Cambridge, Massachusetts, Caracas, Venezuela, Lusaka, Zambia and Fukuoka, Japan.

The results of the university's work are disseminated in policy papers, scientific publications and in five professional journals. Postgraduate training has been provided to more than 2,000 UNU fellows from developing countries.

CORRECTION

The paper 'Cost of Higher Education' published in the 22 February 1993 issue of *University News* was not written by C.R. Mitra as erroneously mentioned. It had been authored by M.S. Ramamurthy former Joint Secretary, Association of Indian Universities and Editor, *University News*. The mix up is deeply regretted.

Champion Colleges Tournament

The first 'Champion Colleges' Hockey Tournament was organised by the Association of Indian Universities in collaboration with the Jawaharlal Nehru Hockey Tournament Society during 12 - 19 February, 1993 at Shivaji Stadium, New Delhi. 16 Champion Colleges Teams of first four zonal qualifying universities in the Inter-University Tournament were invited to participate.

The tournament has been conceived to bridge gap between the junior and the senior level hockey players. It was felt necessary that to improve the standards of hockey in India an intermediate level tournament at the college level should be started. It could work as a filler between school going students and the university level players.

To generate interest in the tournament and attract keen participation by the college players the Steel Authority of India (SAIL) offered prize money to the extent of Rs. 2.20 lakhs. Besides this handsome amount Rolling Trophies for Winners and Runner's Up were also instituted. The SAIL also provided individual prizes and mementos. Necessary travelling, boarding and lodging and transport facilities to all the teams were provided by the organising committee constituted under the chairmanship of Prof Sayid Hamid, Former Vice-Chancellor, Aligarh Muslim University. The break-up of the prize money was as follows :

- | | | |
|-----|-------------|---------|
| i) | Winners | 1,00000 |
| ii) | Runner's Up | 60,000 |

- | | | |
|------|---------------------------|------------|
| iii) | 3rd Position Holder | 30,000 |
| iv) | 4th Position Holder | 10,000 |
| v) | Coach of the Winning Team | 5,000 |
| vi) | Six Best Players | 2,500 each |

The tournament was declared open by Shri M.S. Bhagwat, Secretary, Department of Youth Affairs & Sports. The tournament was played for 8 days on league-cum-knock out basis. N.A.S. Colleges,

Meerut, won the tournament. Pachaiyappa's College, Madras, Sri Aurobindo College, Delhi and Khalsa College, Amritsar, were the runner's up, IIIrd & IVth position holders respectively. Shri Ramesh Chandra, Administrator, New Delhi Municipal Committee hosted a reception in the honour of the visiting teams. Prof. K.B. Powar, Secretary General, AIU, was introduced to the finalist teams, i.e. N.A.S. College, Meerut & Pachaiyappa's college, Madras. Shri S.N. Das, Director (Personnel) gave away the cash awards to the winners. Prof S.K. Agrawala, Former Secretary General, AIU gave away the trophies and mementos to the teams.

South Zone Youth Festival

The South Zone Inter University Youth Festival sponsored by the Association of Indian Universities (AIU) and the Department of Youth Affairs and Sports, Government of India was recently held at the Calicut University, Kozhikode. The Festival was inaugurated by Kerala State Education Minister, Shri E.T. Mohammed Basheer. More than 600 student Youth artists from 22 universities participated. The competitions were held in the events of Music, Dance, Theatre, Fine Arts and Literary Activity.

Following the inaugural function the classical dance competition was held in which Andhra, Calicut, Mahatma Gandhi, Mysore and Kerala Universities participated. The dances performed by Calicut University (Mohiniattam) and Mahatama Gandhi University (Kuchipudi) drew instant applause from the audience.

The Skit, Mime, One Act Play, Group Dance, Light & Classical Vocal Solo Competitions were held on the second day.

Of the 19 teams, which participated in the skit competition, Kuvempu University, Mahatma Gandhi University, Kerala University and Kerala Agricultural University won the appreciation of the audience. This was followed by the Mime competition in which 16 presentations focused on the evils of the dowry system.

The One Act Plays, most of which were dialogue oriented, depicted atrocities on the Indian woman, power politics and communalism. The presentations of Mahatma Gandhi University and Kerala University were adjudged the best two entries and recommended for the National Festival.

In the Group Dance even, University of Agricultural Sciences, Dharwad, the Bharathidasan and Mysore Universities drew spontaneous audience applause. The Dance event of University of Agricultural Sciences, was the notable one which depicted the hunters; jubilation on killing of a deer in the best of 'Khasi' traditions.

The light and classical vocal soloists tendered melodies, which sounded just out of this world. The Young Vocalist from Telugu University emerged the best for her fascinating song.

12 teams participated in the painting competition. The paintings

which portrayed 'A Festival' or 'A Roadside Scene' attracted maximum number of entries. This was followed by classical instrumental solo, the Quiz, poster making and cartooning competitions.

In the Western vocal solo and the western group song sections Mahatma Gandhi University spell bound the audience by their sterling performance. Bharathidasan and Mysore Universities grabbed the limelight in the Indian group song competition. Mahatma Gandhi University, Kottayam and Karnataka University, Dharwad both excelled at Clay Modelling.

Rangoli was the new addition to the Unifest '93 competitive items. It is popularly known as 'kolam' in Kerala and Tamil Nadu, 'Alpana' in Bengal, 'Moggu' in Andhra Pradesh and 'Chowk Poorna' in Uttar Pradesh. Manomaniam Sundaranar University, Tirunelveli and Bharathiar University, Coimbatore, proved their strength in this event.

At the valedictory function the State Minister for Youth & Sports was the Chief Guest who gave away the prizes. The Mahatma Gandhi University, Kottayam emerged as overall champions while Kerala University finished a close second.

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Inter University South Zone Youth Festival - 1992-93

Result

1.	Classical Vocal Solo	:	1. Karnataka University Dharwad	11.	One Act Play	:	1. Mahatma Gandhi University, Kottayam
2.	Classical Instrumental Solo – Percussion	:	1. Kerala University 2. University of Agril. Sciences, Dharwad	12.	Skits	:	2. Kerala University Mahatma Gandhi University, Kottayam
3.	Classical Instrumental Solo – Non-percussion	:	1. Kerala University 2. Andhra University	13.	Mime	:	1. Kerala University 2. Alagappa University
4.	Light Vocal Solo	:	1. Telugu University 2. University of Calicut	14.	On the Spot Painting	:	1. University of Calicut 2. Madurai Kamaraj University
5.	Western Vocal Solo	:	1. Mahatma Gandhi University, Kottayam 2. Madurai Kamaraj University	15.	Collage	:	1. Mahatma Gandhi University, Kottayam 2. Bharathidasan University
6.	Group Song – Indian	:	1. Bharathidasan, Tiruchirappally 2. Mysore University	16.	Poster Making	:	1. University of Calicut 2. Karnataka University, Dharwad
7.	Group Song - Western	:	1. Mahatma Gandhi University, Kottayam 2. Bharathidasan University	17.	Clay Modelling	:	1. Mahatma Gandhi University, Kottayam 2. Karnataka University, Dharwad
8.	Folk/Tribal Dance	:	1. University of Agril. Sciences, Dharwad 2. Bharathidasan University	18.	Cartooning	:	1. Karnataka University, Dharwad 2. University of Calicut
9.	Classical Dance	:	1. Calicut University 2. Mahatma Gandhi University, Kottayam	19.	Rangoli	:	1. M.S. University, Tirunelveli 2. Bharathiar University, Coimbatore
10.	Quiz	:	1. Kerala University 2. Mahatma Gandhi University, Kottayam				

Overall Championship Trophy : Mahatma Gandhi University, Kottayam
Runners Up Trophy : Kerala University, Kerala

Organising Tutorials

G.R. Sudame*

M.M. Pattanshetti, Designing and Organising Tutorials in Colleges and Universities. Davangere, You Need Publications, 1992. pp III + 116. Rs. 150/-

The university education system in India has grown phenomenally since 1947, after the country attained Independence. About four million students are catered to by over 200 universities and 7000 colleges at present. With a few notable exceptions, a majority of colleges organise their instructional activities through lectures given to large number of students in crowded classrooms. Needless to say that mere lecturing hardly leaves any scope for meaningful interaction between the teacher and the students. There is no way to find out if the students, listening the teacher's lecture passively, have learnt anything. This unitrack system of instruction at the higher education stage has been adversely commented upon by the several commissions and committees from time to time. Remedial measures have been suggested, which mainly focus upon organisation of small group interactional sessions between teachers and students to facilitate individual attention to students' difficulties. The University Grants Commission (UGC) has strongly emphasized the organisation of tutorials to supplement teaching through lectures in colleges. But, the average college teacher is not trained to organise tutorials and other small group interactional activities. In this context, Pattanshetti's publication is a welcome addition to the literature on

improving instruction at the higher education stage in India. The book consists of eight chapters, which besides discussing the concept of tutorials, their need and importance, focus in detail upon practical aspects of their organisation in colleges.

The first introductory chapter surveys the growth of higher education in India, present condition of teaching in colleges and attempts by the UGC and other agencies to improve the standards of teaching in higher education, including the guidelines regarding workload of various categories of teachers. The author has pointed out that as per the UGC guidelines, both undergraduate and postgraduate teachers are expected to devote four hours per week in conducting tutorials. Chapters two and three discuss the concept of tutorials, their meaning and nature, objectives, advantages, need and usefulness, with supportive quotations from many sources. According to the University Education Commission (Radhakrishnan Commission), tutorial instruction means that a student meets a teacher, atleast once a week, for private or personal advice and guidances. Tutorial can be described as face to face contact between a teacher and small group of students organised periodically to solve the academic difficulties of students. Pattanshetti has developed an operational definition of tutorial considering economic, academic and other factors in the country. According to his definition, the tutorial is a group discus-

sion based on the content presented in the previous lecture classes in that particular subject, an essay or other material written by the students or any question raised by the teacher or students. The students may discuss about assignments, get clarifications to their doubts and permitted to develop writing and oral skills. The important objectives of tutorial, according to the author, are to establish cordial relations between teachers and students, to provide remedial instruction, to supplement the classroom lectures, to encourage the students to familiarise with textual and other reference materials, to motivate them to express clearly and effectively and thus maximise learning in a relaxed atmosphere in the small group. The important advantages of the tutorial are the opportunity it offers to both the teacher and the taught to think out different teaching learning strategies for preparing assignments, conducting discussions, solving academic difficulties and problems, etc. Besides, unlike the lecture session, a student is free to ask for any clarifications and raise questions in the tutorial.

Education Commission (1964-66) has suggested a significant reduction of formal instruction and a corresponding increase in tutorial work, group discussions, seminars and independent study. As there is hardly any scope in a formal lecture class for the students to express their own ideas or raise questions, tutorials are a must in colleges, especially for first year students. The author has found out that in Davangere city many students do not read even the prescribed textbooks, but rely on lecture notes or cheap guides. In such a situation, organising tutorials is not only urgently needed, but appears to be the only solution to the incomplete and inefficient instruction through lectures.

Chapters four, five and six describe in great detail the size of

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the tutorial batch, framing the tutorial time table and strategies for conducting tutorials. Though the book is addressed to higher education teachers all over the country, the discussion regarding the practical aspects of designing and organising tutorials is limited to Karnataka State only with illustrations from the author's own college. As expected Pattanshetti ends with practical limitations, such as number of classrooms and teachers available, to arrive at the optimum size of the tutorial batch, organisation procedures and strategies for conducting tutorials. A lot of space is devoted to detailed time tables, attendance sheets, yearly cycle for organising tutorials, etc. with examples from the author's colleges.

As individual attention to each student is necessary in a tutorial class, the tutorial batch should ideally consist of a minimum number of students. What is the optimum number; five, ten, fifteen or twenty? Should all tutorial batches be of the same size? There cannot be any definite answer to such questions. The size of the tutorial batch should be based on certain considerations such as instructional objectives, size of available rooms, teacher's role-domineering or facilitating, ability of students to take up the responsibility for conducting tutorials, etc. In practice the number of rooms and total time available and the number of teachers (medium of instruction and subjectwise) available are the crucial factors that decide the size of the batch. It must however be noted that tutorial batches should not exceed a manageable number, giving scope to each individual to express freely in the group.

Framing the tutorial time table can be a complex and complicated exercise in a college having a few hundred students studying various subject combinations through different media of instruction. Pattanshetti has described in detail how such an exercise was successfully carried out in his college. He has also suggested procedures for monitor-

ing the presence of students, recording their progress through evaluation profiles, reporting the progress of students to parents and guardians, etc. The tutorial session is meant to conduct a variety of instructional activities, such as improving skills of note taking, writing essays and assignments on topics suggested by teachers or chosen by students, evaluation of students' essays and assignments and appropriate feedback to them and encouraging students to conduct discussion sessions. The author has discussed a variety of strategies to be adopted in conducting tutorials, including sub-grouping, prompting techniques and brain storming methods. He has also described appropriate procedures for assessment of students in tutorial sessions.

Chapter seven is devoted to a discussion of the teacher's role in conducting tutorials. The teacher's instructional role has been restricted to the students' cognitive development for long; his role needs to be extended to the social and emotional development of students too. The teacher should try to be a facilitator, rather than a mere transmitter of information through traditional lecturing. The tutorial enables the teachers to act as facilitators, encouraging the students to learn through self study and group interaction. To prepare for such a role, the teacher has to continuously update his knowledge, read latest books and journals in his subject and

be interested in and familiar with the problems of his students, both academic and socio-personal. More importantly, he should develop an attitude of sympathy for his students, so that they will feel free to seek his guidance in academic as well as personal matters.

The last chapter mentions some problems in designing and organising tutorials, to which solutions such as orientation of college teachers have been suggested. The academic staff colleges can play a vital role in developing the needed skills in designing and organising tutorials through their orientation and refresher programmes. The students also need to be oriented for participation in tutorials, so that they know what to expect from these small group interactional sessions.

The book is useful in giving certain ideas to college teachers in the basics of tutorials. By its very nature, designing and conducting tutorials is a highly flexible instructional activity, which will differ from college to college and state to state in a large country such as India. Therefore, it would be difficult to suggest a particular model with fine details. Pattanshetti has mainly addressed his book to his colleagues in Karnataka and it is hoped that they will find his many practical suggestions for organising tutorials useful. There is a lot of overlap and repetition of the text in different chapters, which could have been avoided.

UNIVERSITY GRANTS COMMISSION

NOTIFICATION

It is notified that the next UGC Test for Junior Research Fellowship and Eligibility for Lectureship will be held on 20th June, 1993. The candidates who desire to appear in the Test may see the detailed advertisement in the Employment News dated 27th February, 1993.

Dr. N.K. Jain
Deputy Secretary
dmp 823(16)82

A list of select articles culled from periodicals received in AIU Library during February 1993

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A List of Doctoral Theses accepted by Indian Universities

BIOLOGICAL SCIENCES

Anthropology

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2. Malik, Prabha. Familial correlations and heritability of body dimension of adult Punjabi Khatri's in Delhi. Delhi.
3. Mandarapu, Ramesh. A genetic study of the Bellis. Andhra.
4. Saklani, Beena. Birth and child rearing practices in Garhwal Himalaya: An anthropological perspective. Garhwal. Dr P C Joshi.
5. Sharma, Nivedita Meera. The study of creases in forensic investigations. H S Gour. Dr A N Sharma, Department of Anthropology, Dr Hari Singh Gour Vishwavidyalaya, Sagar.
6. Swami, Anju. Occupational health hazards in stone quarry workers: Morphophysiological study of Mails of Rajasthan. Delhi.

Environmental Sciences

1. Bhaskara Rao, Chedella. Studies on pollination ecology of some plant species. Andhra.
2. Kar, Ghanendra Kumar. Limnological studies on Hirakud Dam reservoir and river IB with reference to paper mill waste pollution. Sambalpur. Prof N C Dash, Post Graduate Department of Life Sciences, Sambalpur University, Jyoti Vihar.
3. Poonam Kumar. Influence of environment, biodegradation and cytological studies of some vegetables in and around the market of Patna. Magadh.
4. Rajalakshmi Amma, P. Studies on the toxic effects of selected heavy metals in the freshwater mussel, *Lamellidens cornutus* LEA. CUST. Dr A Mohandas, Head, School of Environmental Studies, Cochin University of Science and Technology, Kochi.
5. Singh, Mridula. Studies on biological treatment of industrial waste water. Durgawati. Dr S K Hasija, Prof and Head, Department of Biosciences, Rani Durgawati Vishwavidyalaya, Jabalpur.
6. Tyagi, Rakesh Kumar. Studies on translocation of L-alanine: 4,5-dioxovalerate transaminase from cytosol to mitochondria. JNU.

Marine Sciences

1. Bulusu, Venkata Sreeramachandra Murthy. Taxonomic and electrophoretic studies on three genera of penaeid prawns of the East Coast of India and some aspects of the biology of *Metapenaeopsis barbata* De Haan 1844 from Visakhapatnam. Andhra
2. Geetha, T S. Effects of binary mixtures of metals on an estuarine clam: Assessment and kinetics. CUST. Dr Jacob Chacko, Reader, School of Marine Sciences, Cochin University of Science and Technology, Kochi.

3. Paul, M. Trace metal speciation in the Cochin estuary. CUST. Dr Jacob Chacko, Head, Chemical Oceanography Division, School of Marine Sciences, Cochin University of Science and Technology, Kochi.

4. Sujatha, C H. Dynamics of some environmentally significant pesticides in a tropical waterway: A toxicological approach. CUST. Dr Jacob Chacko, Reader, School of Marine Sciences, Cochin University of Science and Technology, Kochi.

5. Supriya, R. Studies on the survival of *Sunetta scripta* in different salinities. CUST. Dr R Demodaran, Prof, School of Marine Sciences, Cochin University of Science and Technology, Kochi.

6. Vasudevan Nayar, T. Biogeochemistry in the sedimentary environments of Cochin Estuary. CUST. Dr Chandramohana Kumar, Lecturer, School of Marine Sciences, Cochin University of Science and Technology, Kochi.

Biophysics

1. Bagga, Rajesh. Unusual DNA structures and transcription control. IISc.

Biochemistry

1. Aryan Namboodiri, M S. Anti-DNA antibodies in systematic lupus erythematosus and their induction in mice. IISc.
2. Bhaduri, Saswata. Analysis of guanosine-3': 5'-cyclic monophosphate induced derepression of operon under condition of glutamine repression in *Bacillus subtilis* B34. Calcutta
3. Bhat, Manoj Kumar. Studies on the toxic phospholipases from the Indian cobra, *Naja naja naja* venom and their detoxification by active plant components. Mysore.
4. Dasgupta, Jaydip. Studies on genomic DNA of some *Brassica* species with special reference to repetitive DNA. Calcutta
5. Devi Prasad, P. Studies on riboflavin carrier protein: Isolation and hormonal modulation of its biosynthesis in the mammary gland and characteristics of its placental receptor. IISc.
6. Kanuru, Manorama. Studies on red palm oil, Elsels gunjeansis nutrition - bio-chemical and toxicological aspects. Osmania.
7. Karnik, Arti. Study of immunodeficiencies. Devi Ahilya. Dr R Vijayvarghya, T Chithram Hospital and Research Centre, Indore
8. Koratkar, Revati. A study of the antimutagenic actions of protocyclic and its mechanisms. Osmania.
9. Umesh Kumar. Role of *Saccharomyces cerevisiae* in manipulating rumen metabolism in buffaloes. PAU.
10. Patel, Manu Bhai. Plant tissue culture studies in some members of family Leguminosae and Brassicaceae. Devi Ahilya. Dr R Bhardwaj, Department of Biochemistry, Devi Ahilya Vishwavidyalaya, Indore.

11. Salomi, M J. Anticancer activity of medicinal plants. Calcutt. Dr K R Panikkar Awarthy, T C 3/1996, Sivamangalam Lane, P O Patten Palace, Trivandrum.
12. Upadhyay, Poornima. Identification of a positive Cis-acting DNA element and transacting factor(s) regulating CYP2B/B2 gene transcription in rat liver. IISc.
13. Venkateswara Rao, M. Identification of a negative Cis-acting DNA element regulating transcription of CYP2B1/B2 gene in rat liver. IISc.
14. Zulfiquar Ahmad. Structural and thermodynamic studies of partially denatured states of cytochrome - C. Jamia. Dr Faizan Ahmad, Department of Chemistry, Jamia Millia Islamia, New Delhi. Biotechnology
1. Joseph, Gerald Theodore. Cloning, expression and evaluation of the diagnostic antigens of bancroftian filariasis. Anna.
 2. Venkatesh Gopal, K. Cloning and characterisation of the antigen(s) of an avian adenovirus: The egg drop syndrome virus (EDS 76). Anna.
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 - 5 Patel, Sangataben Shashikant. Some studies on biophysical characterization of *Halobacterium halobium* and its exploitation towards photohydrogen production along with cyanobacteria. Patel. Dr Datta Madamwar
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 - 2 Ambawatia, Ghansham To study the drought resistance of some wheat genotypes in relation to their seed germination and plant characteristics. H S Gour. Dr T R Sahu, Department of Botany, Dr Hari Singh Gour Vishwavidyalaya, Sagar and Dr D C Garg, Govt N M V College, Hoshangabad.
 - 3 Ambrish. Effect of supplemental ultraviolet-B radiation on growth and composition of certain legume crops. Garhwal. Dr V K Jain.
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 - 14 Kusum Lata. Regeneration potential photosynthetic biomass and nutrient cycling of a moist temperature forest in Garhwal Himalaya. Garhwal.
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related conditions. Durgawati. Dr G P Agrawal, Prof and Head (Retd), Department of Biosciences, Rani Durgawati University, Jabalpur and Dr C B Singh, Prof and Head, Department of Plant Breeding and Genetics, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur.

26. Raj Kumar. Studies on algae of cultivated fields, Odisha. Odisha.
27. Rajput, Anjana. Seed biology of some selected tree species of Central India. H S Gour. Prof G P Mishra, Department of Botany, Dr Han Singh Gour Vishwavidyalaya, Sagar.
28. Saket Vihar. Ecological study of *Helianthus annuus* L from Bihar Sharif, Bihar. Magadh.
29. Saklani, Arvind. Cross cultural ethnobotanical studies among the tribes of North Eastern India. Garhwal. Dr S K Jain.
30. Sarvepalli, Badri Narayan. In vivo and in vitro studies on neurotoxin in *Lathyrus sativus* L. Baroda.
31. Singh, Anop. Eco-physiology of *Podophyllum hexandrum hexandrum Reyle*. Garhwal. Dr A N Purohit.
32. Singh, Sunita. Ecological studies on natural vegetation around thermal power plant with special reference to the impact of fly ash and afforestation prospects in ash dumpa. H S Gour. Prof S C Agarwal, Department of Botany, Dr Han Singh Gour Vishwavidyalaya, Sagar.
33. Tiwari, Shailendra Kumar. In vitro propagation of medicinally important forest plants of Madhya Pradesh. Durgawati. Dr S K Hanja, Prof and Head, Department of Biosciences, Rani Durgawati Vishwavidyalaya, Jabalpur and Dr Ram Prasad, Director, State Forest Research Institute, Jabalpur.
34. Urmia Srawan. Reproductive biological studies of forest tree seeds. H S Gour. Prof G P Mishra, Department of Botany, Dr Han Singh Gour Vishwavidyalaya, Sagar.
35. Vaid, Neelam. Effect of growth regulators on metabolism and yield components in some oleiferous *Brassica* spp.. PAU.

Agriculture

1. Dighya, Jayant Kumar Manohar. Pattern of nutrient uptake in wheat varieties under Mahwa Phreat. Devi Ahilya. Dr Y M Upadhyaya, 68, Prakash Nagar, Indore.
2. Gaurola, Vandana. Pigment and protein profile of *Eugenia* leaves under sun and shade and heat checks. Garhwal. Dr A N Purohit.
3. Gurnam Singh. Physiological effects of insecticides on reproduction of mustard oilseed, *Lipaphis erysimi* (Kaltenbach). PAU.
4. Murali, K S. Vegetative and reproductive phenology of a tropical dry deciduous forest, Southern India. IISc.
5. Patil, Shankargouda. Study on the utilization of some waste materials of forests for wood-cement composites and pulping. Y S Parmar. Dr A N Kaushal.
6. Sanjiv Kumar. Studies on stem rot of chickpea. PAU.
7. Sharma, Vishwa Mitter. Effect of maize based intercropping on nitrogen economy in wheat. HP Krishi. Dr I S Chakor.

8. Singh, Narendra. Potassium nutrition of apple. Y S Parmar. Dr R P Awasthi, Prof and Head, Department of Fruit Culture and Orchard Management, Dr Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan.

Zoology

1. Arya, Rashmi. Studies on the corpora allactaria post-ovulatory follicles and cytoarchitectural relationship between the pituitary and growing oocytes of *Batrillus bola* Hamilton. Garhwal. Dr R M Saxena.
2. Bhuradari, Sugandha. An analytical study of antigens producing contact dermatitis with special reference to trace elements and enzyme superoxide dismutase. Devi Ahilya. Dr N C Sethi, 583, M G Road, Manik Bhawan, Turkaganj, Indore.
3. Bhutta, Seajay. Studies on the insect pests of Poplars in Jammu forests of Jammu and Kashmir State. Jammu. Dr Baldev Sharma, Reader, Department of Zoology, University of Jammu, Jammu.
4. Chatterji, Anuradha. Measurements of the force-velocity relationship of frog skeletal muscle. Jamia. Prof M Amin, Department of Biosciences, Jamia Millia Islamia, New Delhi.
5. Chaurasia, Prabha. Changes induced by chemosterilants in some insect pest tissues. H S Gour. Dr (Miss) Smita Banerjee, Department of Zoology, Dr Hari Singh Gour Vishwavidyalaya, Sagar.
6. Choudhary, Seema. Effect of pesticides on the blood of the albino rat. H S Gour. Dr (Mrs) S Sahai, Department of Zoology, Dr Han Singh Gour Vishwavidyalaya, Sagar.
7. Dutt, Om Prakash. Study on the effect of selected plant bioproducts on some pulse beetles. Barkatullah.
8. Dubey, Abha. Studies on biology of monogenean trematodes and their parasitic effects on fresh water at Raipur. Ravishankar Dr A K Gupta, Lecturer, School of Studies in Biosciences, Pt Ravishankar Shukla University, Raipur
9. Dwivedi, Sanjay. A comparative cytoarchitectural study of reptilian hypothalamus including developmental, neuronal tracing and immunocytochemistry in *Calotes versicolor* Dan. Nagpur. Prof P D Prasad Rao, Department of Zoology, Nagpur University, Nagpur.
10. Gupta, Arun Kumar. Feeding biology and some aspects of ecology of fishes inhabiting Lake Mansar, Jammu. Jammu. Dr Y R Malhotra, Prof, Department of Zoology, University of Jammu, Jammu.
11. Ishrat Alim. Bacteriological and heavy metal valuation of waste stabilization ponds for carp culture. Barkatullah.
12. Kaushik, Shailendra. Ecological studies of some waterbodies at Gwalior, Madhya Pradesh. Jiwaji. Dr D N Saxena, Reader, Department of Zoology, Jiwaji University, Gwalior and Dr M N Saxena, Principal (Retd), School of Studies in Zoology, Jiwaji University, Gwalior
13. Kushwah, Kusum. Toxicological effects of Neem, *Azadirachta indica* (A) Juss oil on albino rats. Jiwaji. Dr A O Prakash, Department of Zoology, Jiwaji University, Gwalior.

14. Mahuli, Man Mohan. Insecticide resistance in mosquitoes of Bhopal District, with reference to bionomics, taxonomy, biology and periodicity. Barkatullah.
15. Misra, Om Prakash R. Effect of mulching and anti-transpirants on yield and yield contributing characters of rainfed wheats. Devi Ahilya. Dr Y M Upadhyaya, 68, Prakash Nagar, Indore
16. Mookerji, Nandita. Comparative experimental studies on the feeding ecology of the larvae of rohu, Labeo rohita and singhi, Heteropneustes fossilis. Delhi
17. Pandoh, Baldev Raj. Ecological studies on trematodes of some aquatic vertebrates of Jammu province. Jammu Dr P L Duda, Prof, Department of Zoology, University of Jammu, Jammu.
18. Pant, Kanchan. Relative roles of thyroid hormones in vertebrate physiology. Garhwal.
19. Patil, Sunita Madhukar. Multifunctional role of vertebrate epidermis with reference to the barrier properties under varied conditions. Baroda
20. Paul, Palle Luther. Development of certain endocrine glands and gonads in the common carp, *Cyprinus carpio* Linnaeus. Nagpur
21. Prabhakara Rao, P. In vivo effects of anthelmintic drug on certain aspects of metabolism in cestode parasite of *Streptopelia chinensis suratensis* Gmelin 1789. Osmania
22. Prasad, Yogendra. Studies on bacterial fish diseases, their prophylactic and therapeutic measures. Barkatullah
23. Purvarkar, Ravi Shankar. Neuroanatomical studies of male genital organs of *Funaambulus* species. Devi Ahilya. Dr R S Purvar, Department of Zoology, Holkar Science College, Indore
24. Qureshi, Majid Mohammed. Evaluation of physico-chemical factors of oxidation ponds of Bhopal. Barkatullah
25. Sabnkar, Praveena. Genetic studies on pardhi population of Andhra Pradesh. Osmania
26. Salikineedy Kushore. Studies on monogenetic trematodes of Visakhapatnam. Andhra
27. Sarat Chandran, K. Interaction of some pesticides with rhizobia growth and Rhizobium leguminosarum - Pisum sativum (Garden pea) symbiosis. Delhi
28. Sen, Kalpana. Studies on free-living amoebae isolated from sewage of Calcutta. Calcutta
29. Shah, Pinky. Individual and cumulative studies on the toxic effects of pesticide, fertilizer and heavy metal on the intestine of *Glossogobius giuris* Ham. Barkatullah
30. Sharma, Anju. Induced ovarian maturation in fingerlings of *Channa punctatus* Bloch and *cyprinus*, *Carpinus communis* Linnaeus and advancement of spawning in some adult fishes of Jammu. Jammu Dr Y R Malhotra, Prof, Department of Zoology, University of Jammu, Jammu and Dr Kadambi Gupta, Lecturer, Department of Zoology, University of Jammu, Jammu.
31. Sharma, Meenakshi. Hydrobiological studies of Bhilai reservoirs with reference to zooplankton and fishery prospects. Barkatullah.
32. Singh, Birendra. Ecological studies on phthirapteran ectoparasites infesting certain domestic mammals of Dehradoon District. Garhwal.
33. Singh, Mahavir. Limnological studies on a higher altitude lake Deoria Tal of Garhwal, Himalaya. Garhwal Dr P C Sharma
34. Thiayagesan, K. Ecology of cavity nesting birds in and around Mayiladuthurai, Tamil Nadu, South India. Bharathidasan. Dr M C Sathyazayana, Division of Wildlife Biology, A V C College, Mannampandal, Mayiladuthurai.
35. Tripathi, L K. Studies on morphology and pathogenic significance of trematode parasites of some hill stream fishes of Garhwal. Garhwal. Dr R K Jauhar
36. Upmannu, Reeta. Changes in serum protein contents, aminoacids and cholesterol of brain, liver and kidney under the influences of pesticides in fishes. H S Gour Dr D K Saraf, Department of Zoology, Dr Hari Singh Gour Vishwavidyalaya, Sagar
37. Zutshi, Neeta. Effect of Jammu City sewage water on abiotic and biotic factors of the river Tawi, Jammu. Jammu Dr SPS Dutta, Medical Sciences
1. Bhashni, Madhur. Immunologic studies related to diagnosis and immune status of children suffering from tuberculosis. PGI.
2. Malladi, Chandra Sekhar. Studies on viral related proteins. Delhi
3. Pal, Shanti N. Mechanism of antidepressant drugs: Some biochemical and behavioural correlates. Jamia Hamdard. Prof P C Dandria
4. Radhika, G. Primary glaucoma: A study on its genetic, biochemical and immunological aspects. Osmania.
5. Radhika, S. Early development and psychoaffective predictors of cerebral palsy in high risk infants. PGI.
6. Seeta, P. Induction and isolation of somaclonal variants in safflower, *Carthamus tinctorius* L. Osmania.
7. Sharma, Kiran. Pharmacological effect of autonomic drugs on isolated melanophores of *Cirrhinus mrigala* and *Ophiocelus cachus*. Barkatullah
8. Singh, Abhay Kumar. Investigation on some antifertility drugs of plant origin. H S Gour Prof V K Dixit, Head, Department of Pharmaceutical Sciences, Dr Hari Singh Gour Vishwavidyalaya, Sagar
9. Surya Kumar, J. Pharmacokinetic interaction studies on some non steroid antiinflammatory drugs (NSAIDS). Kakatiya.
10. Thassu, Deepak Kumar. Formulation and evaluation of transdermal drug delivery systems using pro-drug concept. H S Gour. Dr S P Vyas, Department of Pharmaceutical Sciences, Dr Hari Singh Gour Vishwavidyalaya, Sagar.
- Animal Husbandry**
1. Kashmira Singh. Studies on the effect of maturity and level of nutrition on the carcass characteristics and meat quality of male buffalo calves. PAU.

**KURUKSHETRA UNIVERSITY,
KURUKSHETRA**

(Advt. No. 2/93)

Applications on the prescribed form are invited for the following posts :-

UNIVERSITY TEACHING DEPARTMENTS

1. Reader (Grade: Rs. 3700-125-4950-150-5700) (UGC)

i) Electronic Science (1)
Specialization :

Optoelectronics and Optical Communication/Communication Electronics/Device Modelling and Circuit simulation.

ii) Public Administration (1)
Specialization :

Development Administration/Social Administration/Local Government.

iii) Music (1)
Specialization :

Music (Vocal)

2. Lecturer (Grade : Rs. 2200-75-2800-100-4000) (UGC)

i) History (1)
Specialization :

Medieval Indian History (Desirable : Knowledge of Persian)

ii) Economics (1)

Reserved for Scheduled Caste candidate.

iii) Psychology (1)

Reserved for Scheduled Caste candidate

iv) Geology (1)

Specialization :
Structural Geology/Petrology/Economic Geology/Palaeontology and Stratigraphy/Exploration and Mining Geology/Environmental Geology/Engineering Geology.

v) Geology (1)

Reserved for Scheduled Caste candidate.

3. UNIVERSITY COLLEGE,
KURUKSHETRA

Lecturer (Grade : Rs. 2200-75-2800-100-4000) (UGC)

i) English (Temporary) (1)

- ii) English (1)
Reserved for Scheduled Caste candidate.
 - iii) Psychology (1)
Reserved for Scheduled Caste candidate.
 - iv) Electronics (1)
 - v) Commerce (1)
Reserved for Scheduled Caste candidate.
 - vi) Music (Vocal) (1)
(Leave Vacancy)
 - vii) Physical Education (1)
(Leave Vacancy)
4. University College of Education
Principal : Gr.
- i) Rs. 3700-125-4950-150-5700 (UGC)
 - ii) Rs. 4500-150-5700-200-7300 (UGC)
- (For those who fulfil the conditions laid down by the Haryana Govt.).
- QUALIFICATIONS :**
- a) A consistently good academic record with high Second Class (55% marks or grade B in seven point scale) M.A. Education with B.Ed. (Second class with 50% marks in Theory and practice separately) or Master's degree in any subject with M.Ed. (55% marks in one Degree and 50% marks in the other). (The condition of 55% marks in M.A. Education or Master's Degree in any other subject is relaxable down to 50% marks in the case of a teacher appointed in a University Teaching Department or in a College recognised by the University prior to 27.1.76 provided that such appointment in a College recognised by the University has been approved by the University.)
 - b) An M.Phil degree or a recognised degree beyond the Master's level or published work indicating the capacity of a candidate for independent research work.
- c) Provided that if a candidate possessing the qualifications as at (b) is not available or not considered suitable, the University on the recommendations of the Selection Committee may appoint a person possessing the qualifications as at (a).
- d) Teaching experience of at least 10 years in a recognised College or University Teaching Department out of which teaching experience of atleast 5 years should be in a recognised College of Education or the Department of Education of a University.
- e) Persons with some administrative experience including financial accounting in an educational institution will be preferred.
5. Programmer (For Computer Centre)
(1) Grade . Rs. 700-40-1100-50-1300
(Unrevised - likely to be revised)
- Qualifications :**
- i) M.Tech (Computers) or M.C.A. with a minimum of 55% or 6.15 points in the 9 point scale (3 years Degree)
- OR**
- M.C.A. (2 years Degree Course) with 60% at 6.7 points in the 9 point scale (First Division).
- ii) Minimum experience of three years in programming & data base management systems on any standard Makes of Super-Mini or Main Frame Computers with a good knowledge of integral operating systems. Should have a good knowledge of UNIX operating systems, C Language and any one Computer Language out of COBOL, FORTRAN 77 & PASCAL. Must have a good knowledge and practical experience in handling PCXT and PCAT and MSDOS.
6. Sub-Divisional Officer (1)
Grade : Rs. 2200-75-2800-100-4000
(as Haryana Govt. pattern)

Qualifications:

B.E. (Civil) with 2 years' experience, preferable for internal candidates; S.O./J.E. with 3 years' experience.

- 7. Landscape Officer (1)**
Grade : Rs. 2200-75-2800-100-4000

Qualifications :

- B.Sc. (Agriculture) with Horticulture/Landscape as Major subject. M.Sc. (Agriculture) Landscape preferred.
- Minimum five years' experience in a field of landscape, Arboriculture and Nurcery production.

- 8. Research Officer (1)**
(For Women's Studies Research Centre)
Grade : Rs. 2200-75-2800-100-4000

Qualifications :

- A Doctorate Degree or Research work of an equally high standard in Social Sciences/Sciences/Education/Humanities.
- Good Academic record with atleast second class (C in the seven point scale) Master's degree in Social Sciences/Sciences/Education/Humanities from an Indian University.

Desirable :

The candidate should have research work in the area of Women's Studies

- 9. Technical Lab. Assistant (1)**
(For Dept. of Special Assistance)
Grade : Rs. 950-20-1150-EB-25-1500

Qualifications :

Matric with Science 1st Class

OR

Matric with Science Second Class with three years' experience in the line.

- 10. Librarian in the Institute of Sanskrit & Indological Studies (1)**
Grade : Rs. 1600-50-2300-EB-60-2660

Qualifications :

- M.A. Sanskrit 2nd Division (55%)
- M.Lib. Science good 2nd Division (55%)

- Three years experience as Professional Assistant OR
- M.A. Sanskrit good 2nd Division (55%)
- Diploma/B.Lib. Science 2nd Division (55%)
- Five years experience as Professional Assistant.

Desirable :

Knowledge of some other classical Indian Languages.

Only candidates who meet the qualifications laid down in the booklet attached with the application form and in the advertisement will be called for interview for the teaching posts. Specialization for the post of Reader/Lecturer does not mean merely passing a Compulsory or option subject in the specified specialization in M.A./M.Sc Examinations.

For Reserved posts only candidates belonging to reserved categories should apply.

The applications already received for the post of S.D.O. (Civil) vide Advt. No. 1/92; Research Officer vide Advt. No. 3/89 and 1/91, Lecturer in English vide Advt. No. 1/91; Lecturer in Psychology vide Advt. No. 1/91, Lecturer in Geology vide Advt. No. 2/92, and Lecturer in English (Reserved for Scheduled Caste candidates) vide advt. No. 6/91; for University College have been cancelled and they are required to apply afresh but no application fee is required to be paid by them again.

The prescribed application form for both the teaching and non-teaching posts can be had from the Manager, Printing & Publications, Kurukshetra University, Kurukshetra on payment of Rs. 15/- for Sr. Nos. 1 to 3 and Rs. 10/- for Sr. Nos. 4 to 10 on the counter or by making a written request accompanied by self-addressed envelope (23x10 cms) duly stamped for Rs. 8/- each for teaching and non-teaching posts alongwith the Bank Draft of Rs. 15/- (teaching posts) and Rs. 10/- (non-teaching posts) respectively drawn in favour of the Registrar, Kurukshetra University, Kurukshetra and payable at the State Bank of India, University Campus, Kurukshetra.

Applications on prescribed form (alongwith its eight zeroed copies) complete in all respects (through proper channel for those in employment) should reach the Assistant Registrar (Estt.) of this University by 26-3-93 alongwith bank Draft of Rs. 30/- for

teaching posts and Rs. 15/- for non-teaching posts as application fee, drawn in favour of the Registrar, Kurukshetra University, Kurukshetra or the amount can be deposited with the Cashier of this University and original receipt be enclosed with application form. SC/ST/BC & Ex-Servicemen are exempted from the application fee.

The applications not in the prescribed proforma or incomplete applications not supported with required application fee, attested copies of the certificates or application received after the last date will be liable to be rejected.

REGISTRAR

**WANTED FOR THE
COCHIN COLLEGE,
COCHIN - 2**

- Lecturer in Hindi (Leave Vacancy)
- Lecturer in History (Leave Vacancy)
- Lecturer in Economics (Leave Vacancy)
- Lecturer in Physical Education (Permanent Vacancy)
- Librarian IV Grade (Permanent Vacancy)

All vacancies are on open merit. Age and Qualification as per University/Government rules. Apply within a month of the date of this notification. Application forms can be had from the Principal, Cochin College Cochin - 2 on payment of Rs. 30/- (Rupees Thirty only) Rs. 31/- if by M.O.

Those who applied for the post of Librarian IV Grade earlier (in June 1991) need not apply again.

President,
The Cochin Education Society,
Cochin - 2

WANTED

Lecturers in the following subjects both in Community (Syrian Catholic) and Open merit against retirement vacancies.

- Economics
- Political Science
- Physics
- Physical Education (Male only)

All vacancies are subject to the approval of the Mahatma Gandhi University. Age and Qualification as prescribed by the University/Govt. of Kerala. Application form can be had from the College Office on payment of Rs. 50/- if by post Rs. 60/-. Apply within one month from the date of this Notification. Candidates applied earlier in response to our advertisement dated 28-4-92 need not apply again.

Thrikkakara 18-2-1993

Principal
Bharati Mata College,
B.M.C. - P.O.,
Thrikkakara,
Kochi - 682021.

Institute for Social Sciences and Research

"Greenwoods". Vellore-632 006.

Applications are invited from action-oriented dynamic Indian nationals possessing Post-doctoral experience in Management/Social Work or in any one of the Social Sciences for the posts of Lecturer, Sr Lecturer and Reader

Age 30 to 45, Age relaxation can be given to exceptional cases.

Salary Salary is not a constraint for the right persons

Job Post-graduate teaching, Post-graduate Research Guidance, Design Project proposals etc.,

Apply before 31.03.1993 to the Director, ISSR, Vellore-632006

REGISTRAR

OFFICE OF THE REGISTRAR : DIBRUGARH UNIVERSITY : DIBRUGARH

ADVERTISEMENT NO. 1/93

Applications are invited for the following Posts :-

1 Reader in Assamese (one) :

Specialisation required Group "B" (Language)

2. **Lecturer in English (one) :**
Specialisation required : CIEFL (Hyderabad) Diploma in English language or a qualification equivalent to it. A candidate with specialisation in Phonetics of English or Discourse Analysis will be preferred.
 3. **Librarian (One) :**
 - (a) First or Second class M.Lib. Science.
 - Or
 - MA/M.Sc/M.Com. plus First or Second class B.Lib. Science or Diploma in Lib. Science.
 - (b) At least 10 years experience as Librarian or in a responsible professional capacity in a University Library.
 - (c) Ph.D Degree or equivalent research work in the field relevant to the profession
 - (d) In certain situations in academic Libraries, training in Computerisation/information/technology/Specialised areas may be taken into consideration.
 4. **Statistician (one) :**
 - (a) At least Second class Master's Degree in Statistics with a good academic career
 - Or
 - (b) A graduate with Mathematics and Statistics as a combination in degree level with a minimum of 5 years experience of working in statistical matter in an educational institution/Govt. organisations.
 5. **Mechanic (Electronic) (one) :**
Required HSLC/HSSLC pass with diploma in Mechanic (Electronic) in both cases
 6. **Glass Blower (one) :**
HSLC pass with 10 years of experience.
 7. **Football Coach :**
 8. **Table Tennis Coach (one each) :**
 - (A) The candidate must have represented the state/University in the national level and possess Diploma in coaching from an Institution recognised by the Ministry of Education and Human Resource Development, Govt. of India.
 - (B) Must be a graduate from a recognised University
- (C) Experienced in Coaching, Organising Tournaments at State level/District level is desirable.
9. **Photographer-cum-Cartographer (one) :**
 - a) Degree in Arts/Science/Commerce.
 - b) Diploma in Photography/Cartography, qualification may be relaxed in case of specially deserving candidates having 10 years experience in the field of photography/Cartography.
10. **Senior Accounts Assistant (one) :**
Graduate from a recognised University/Board preferably in commerce and must have 5 (five) years experience in Accounts, compilation works in a University or in any other Educational Institution or Govt./Semi Govt. organisation.

Age limit :

Not less than 18 years and not more than 36 years of age on 1st January, 1993

Educational Qualification and other conditions for teaching posts :

1) Reader :

A) First class Masters degree in Assamese with a good Academic Career with a doctorate degree or equivalent published work. Evidence of being actively engaged in (i) Research (ii) Innovation in Teaching Materials.

B) At least five years experience of teaching and/or research provided that atleast three years experience as lecturer or its equivalent position.

2) Lecturer :

A) A doctorate degree or research work of an equally high standard

B) Consistently good academic record with 1st class or high 2nd class (in the seven point scale) Masters Degree in a relevant subject from an Indian University or an equivalent degree from a foreign University. Having regard to the need for developing interdisciplinary programmes, the degree in (a) and (b) above may be in relevant subjects. Provided that if the Selection Committee is of the view that the research work of a candidate as evident either from his thesis or from his published work is of very high standard, it may relax any of the qualifications prescribed in (b) above for the post of lecturer.

Provided further that if a candidate having a doctorate degree or equivalent research work is not available or is not considered suitable, a person possessing consistently a good academic record (weightage being given to M.Phil or equivalent degree or research work of quality) may be appointed provided he/she has done research work for atleast two years or has practical experience in a Laboratory/Organisation on the condition that he will have to obtain a Doctor's degree or give evidence of research work of equivalent high standard within eight years of his/her appointment as Lecturer failing which he/she will not be able to earn future increment until he fulfills these requirements.

Provided further that if a candidate has first class career (60% or above marks) all through from Matriculation upto the Master degree level, such a candidate can be duly considered by the Selection Committee for appointment as Lecturer by relaxing the qualification for research experience/degree.

9 (nine) copies of applications for teaching Post and 6 (six) copies of applications for other posts on plain paper giving full bio-data including (1) Name in full (In Block Letters), (2) Father's name, (3) Date of Birth, (4) (a) Permanent address, (b) Present address, (5) Present Occupation, if any, (6) Present salary drawn if any and salary expected (7) Academic career in detail from Matriculation upwards showing division/class, aggregate percentage of marks, School/College/University from which appeared, (Attested copies of marksheets, certificates should be enclosed) (8) Details of appointment held with designations, duration and nature of works and name of employers, (9) Research contributions with copies of reprints or research experiences supported by documentary evidence, (10) Name and address of 2 (Two) referees not related to the candidate together with an application fee of Rs. 10/- (Rupees Ten) and Rs. 5/- (Rupees five) for ST/SC candidates only by crossed I.P.O. drawn in favour of the Registrar, Dibrugarh University, Dibrugarh should reach the undersigned on or before 24-3-93.

The number of this advertisement and name of the post applied for must be referred to in the application. Persons who are already in employment should apply through proper channel or with a "NO OBJECTION CERTIFICATE" from the present employer.

All prints of research papers published must be attached in case of teaching posts.

Scale of pay :

1) Reader - Rs. 3700-125-4950-150-
5700/- P.M.

2) Lecturer -	Rs. 2200-75-2800-100- 4000/- P.M.	8) Glass Blower - Rs. 1375-30-1435-40- 1595-EB-40-1635-60-18
3) Librarian -	Rs. 3625-125-4450-150- 5200-175-5900/- P.M.	85-EB-30-2035-60-2395- 80-2875-100-3375-/- P.M.
4) Statistician -	Rs. 1785-50-2035-60- 2095-EB-60-2395-80-24 75-EB-80-2875-100-357 5-125-4200/- P.M.	9) Photographer - do- cum-Cartographer
5) Mechanic (Electronic) -	Rs. 1985-50-2035-60- 2335-EB-60-2395-80-27 95-EB-80-2875-100-357 5-127-3950/- P.M.	All posts carry usual allowances as admissible under the University rules in force from time to time and the incumbents will be eligible for contributory Provident Fund and Gratuity on confirmation as per rules of the University.
6) Coaches -	Rs. 1685-60-1985-EB-50- 2035-60-2335-EB-60-23 95-80-2875-100-3575-12 5-3700/- P.M.	Applications not in conformity with the above requirement will not be entertained.
7) Sr. Accounts Audit -	Rs. 1475-40-1635-50- 1735-EB-50-2035-EB-60- -2395-80-2875-100-3575 /- P.M.	Applications received after the closing date will be rejected.

9) Photographer - do-
cum-Cartographer

All posts carry usual allowances as admissible under the University rules in force from time to time and the incumbents will be eligible for contributory Provident Fund and Gratuity on confirmation as per rules of the University.

Applications not in conformity with the above requirement will not be entertained.

Applications received after the closing date will be rejected.

Candidates will be required to appear before an interview if and when called for.

No TA/DA is admissible for this purpose.

MAHATMA GANDHI UNIVERSITY

No.6721/83/AII(1)/Adress.

18.2.1993

NOTIFICATION

Applications in the prescribed form are invited from qualified candidates for appointment to the following posts in the University. The appointments will be governed by the provisions of the Mahatma Gandhi University Act and the statutes and Ordinances applicable thereunder.

Sl.No.	Name of post	No.of posts	Scale of pay	Specialisation if any	Reservation if any
1.	Director/Professor School of Indian Legal Thought	1	Rs.4500-7300	-	Open
2.	Director/Professor School of Pedagogical Sciences	1	Rs.4500-7300	-	Open
3.	Lecturer School of Indian Legal Thought	2	Rs.2200-4000	-	One post open. One post reserved for Ezhava/Tlayya/Belave

Application forms alongwith details regarding qualifications for the posts, age limits and application fee can be had directly or by post from the Deputy Registrar, Administration II, Mahatma Gandhi University, Priyadarshini Hills P.O., Kottayam 686 560 on payment of Rs.20/- (rupees twenty only) to be remitted by pay-in-clip in the current account of Mahatma Gandhi University with the SBT or in the Government treasury under the Head of Account "MGUP-8658". Applicants from outside the state shall remit the prescribed fee for application form by crossed postal order/Demand Draft drawn in favour of the Finance Officer, Mahatma Gandhi University, payable at Priyadarshini Hills (PO)SBT Athirampuzha. Those who wish to get the application form by post shall send a self addressed envelope of size 27cm x 12cm, affixing stamps worth Rs.2/-. Last date for receipt of filled in applications at this office is 3.4.1993.

Office of the
Mahatma Gandhi University
Priyadarshini Hills P.O.
Kottayam

Dr. M C CHACEQ
REGISTRAR

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

VASANT RAO NAIK AWARD FOR RESEARCH APPLICATION IN AGRICULTURE FOR THE YEAR -1993

Nominations are invited for the Vasant Rao Naik Award for Research Application in Agriculture for the year 1993. One award of the value of Rs. 1,00,000/- in cash is given annually to a scientist or Extension Worker who has made outstanding contribution in the areas of Water Conservation and Dryland Farming.

All Scientists engaged in research in the fields of Water Conservation and Dryland Farming in India shall be eligible for the award. The results of researches achieved/contributions made during the five years preceding the year of the award shall be considered for the award. In the case of a claim based on evolution of new varieties, the final trial should have been completed within the five years preceding the year of the award.

Nominations can be made amongst others by Vice-Chancellors of agricultural universities or other universities having faculty of agricultural or biological sciences, Directors of Research Institutes, including Principals of agricultural and veterinary colleges, Presidents of Scientific Societies, Academies and heads of the Principal Scientific establishments in the country.

Nominations for the awards should be supported by a statement of work, achievement accomplished or performed by the candidate who is being nominated and a reasoned justifications or other supporting data.

The last date for receiving nomination for the award is 30th April '93. The last date for candidates in the Andaman and Nicobar Islands, Lakshadweep, States/Union Territory in the North Eastern Region, Ladakh Division of the J&K States and Sikkim is 10th May '93. Five copies of the nominations on the prescribed proforma for the award should be sent in a sealed cover marked 'Confidential' to Shri K.L. Bokolia, Deputy Secretary (B) Indian Council of Agricultural Research, Krishi Bhawan, New Delhi. The copy of the proforma can be obtained from him by sending a self addressed envelope of the size of 27 cm x 12 cm. Such requests should be received by 10th April '93. Application/nominations received without five sets of reprints of publications are liable to be rejected at the scrutiny stage.

THE OXFORD & CAMBRIDGE SOCIETY OF INDIA SCHOLARSHIPS

1993

The Oxford and Cambridge Society of India invites applications for scholarships being awarded for study at the Universities of Oxford or Cambridge beginning from October 1993. Applicants must hold at least a first class Honours degree or its equivalent from a recognised Indian University. This should be their first opportunity to study abroad. They should have obtained admission to one of the colleges of Oxford or Cambridge, to pursue a course or study leading to the degrees of B.A. (with senior status at Oxford, or affiliated status at Cambridge), M.Sc/J.M.Lit/M.Phil/B.Phil or D.Phil/Ph.D. The scholarship amount, worth Rs. 50,000/- each will be paid into the Scholar-elect's bank account in India once he or she has joined Oxford or Cambridge.

Each candidate will be asked to submit along with the application form the following material :

1. Attested copies of degrees obtained.
2. Certificate of age.
3. Medical Certificate.
4. Two passport size photographs.
5. An essay in 400-600 words (preferably typed) indicating the candidates academic and extra curricular interests and achievements, and the reasons for pursuing a course of study at Oxford or Cambridge.
6. Copy of letter of admission to a college in Oxford or Cambridge.

The Scholarship would be awarded on the basis of a candidate's attainments, potential for excellence and the relevance of the course of studies chosen to later life. Candidates shortlisted would be invited for interviews to be held in Delhi in May 1993.

Application forms may be obtained by sending a self-addressed Re. 1/- stamped envelope (9ins x 4 ins) to the Hon. President, Oxford and Cambridge Society of India, 35-A, Friends Colony (East), New Delhi-110 065. The last date for receiving completed Application Forms is 5th April 1993.

BOOKS FROM ORIENT LONGMAN

Industrial Control and Instrumentation - W.Bolton

The basic aim of this text is to provide a comprehensive introduction to the principles of industrial control and instrumentation. The author not only outlines the basic concepts and terminology of measurement and control systems, he also discusses, in detail, the elements used to build up such systems. As well as a final consideration of measurement and control systems, each chapter concludes with relevant problems in order that students can test their newly acquired knowledge as they progress.

Rs 70.00

Instrumentation and Process Measurements - W.Bolton

The book gives an overview of instrument systems, followed by a look at the constituent elements of such systems, a discussion of measurement systems for process variables and the maintenance of instrument systems. All chapters include worked examples and problems, with answers appearing at the end of the book.

The text is intended for courses where a basic introduction to instrumentation system and process measurements is required.

Rs.50.00



Orient Longman
Orient Longman Ltd.
3-6-272, Himsayatnagar, Hyderabad - 500 029.

VISVA-BHARATI

VINAYA-BHAVANA

Santiniketan Birbhum, West Bengal

Applications on prescribed forms to be filled in by candidates' own handwriting are invited for admission to one-year B.Ed. and M.Ed. courses for the session 1993-94 which begins in July.

A. Minimum qualifications for application for admission to B.Ed. Course :

- i) For Fresher candidates - should have passed B.A./B.Sc. Examination with any two of the following subjects and with at least second class HONOURS in any one of them : Bengali, English, Hindi, Sanskrit, History, Geography, Mathematics, Physics/Chemistry, Life Science (Botany/Zoology). No compulsory additional subject read at the undergraduate course shall be considered for the above purpose. Fresher candidates without having Honours or M.A./M.Sc. degree in any of the above subjects need not apply. There will be an admission test (both written and oral).
- ii) For deputed candidates - should have passed B.A./B.Sc. Examination with any two subjects mentioned in (i) above. Continuous teaching experience as an approved teacher in a recognized secondary school will be taken into account for selection alongwith the M/C resolution of the school concerned.

B. Minimum qualifications for application for admission to M.Ed. course.

Candidates should possess at least a second class B.Ed./B.T./P.G.B.T. degree from a recognized college/institution. Selection will be made on the basis of academic achievement and admission test to be conducted by the Department.

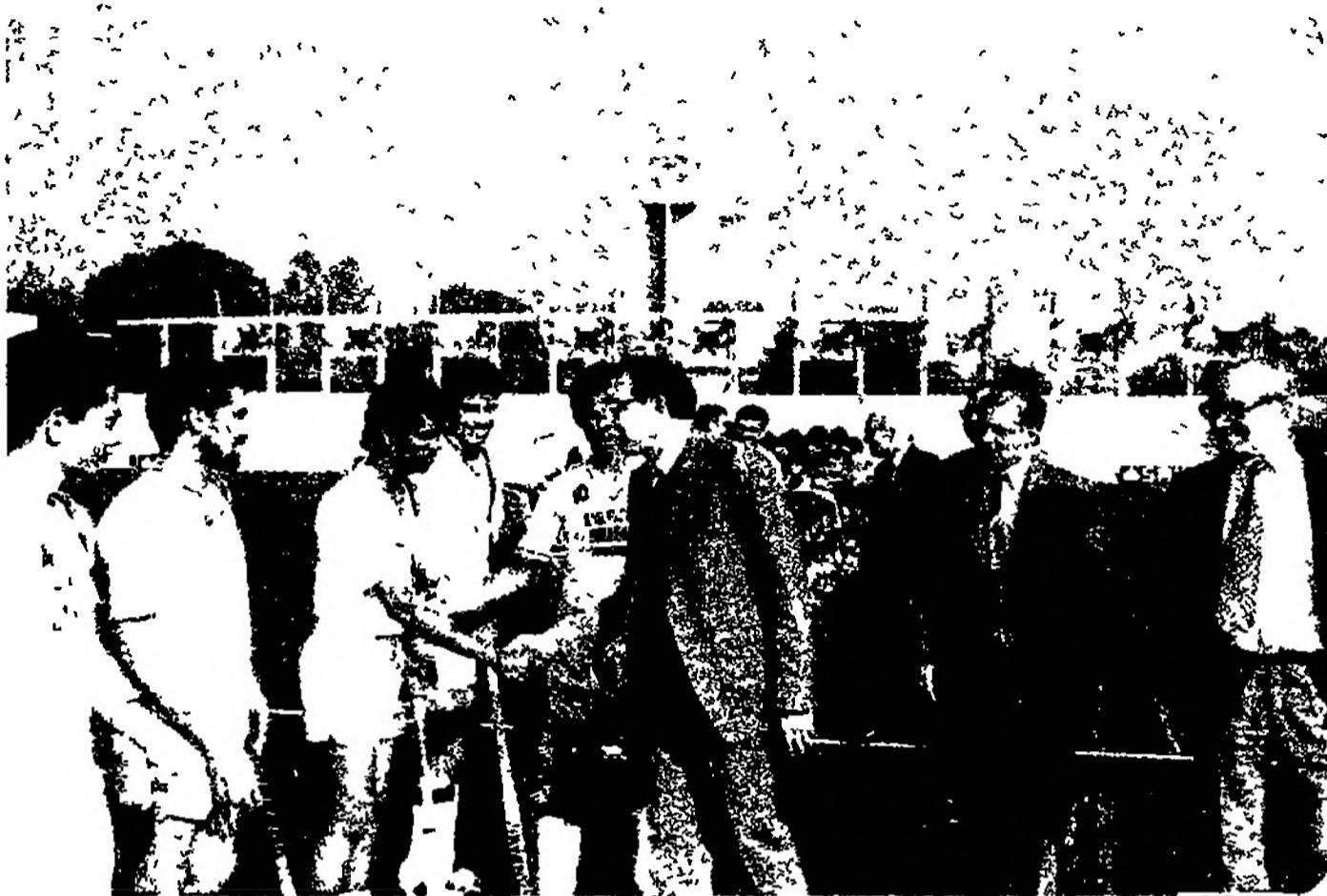
Reservation of seats :

As per Government rules.

Prescribed application forms may be obtained from the office of the Principal, Vinaya-Bhavana, Visva-Bharati, P.O - Santiniketan - 731235, Dist. - Birbhum (West Bengal) by sending a crossed Indian Postal Order for Rs. 5/- payable to the 'Accounts Officer', Visva-Bharati, Santiniketan - 731235 (W.B.) and also a self-addressed envelope (23 cm. x 10 cm.) affixed with postage stamps worth Rs. 2/- only. Application forms may also be obtained personally from the Office of the Principal, Vinaya-Bhavana, Santiniketan on production of a Cash coupon for Rs. 5/- only to be issued from the Office of the Accounts Officer, Visva-Bharati, Santiniketan. Applications duly filled in and completed in all respects should reach the Principal, Vinaya-Bhavana on or before 31st March, 1993.

N.B. : Incomplete applications in any form are liable to be rejected. Right of cancellation of selection/admission lies with the Admission Committee of the Bhavana. Visva-Bharati remains closed on Tuesday afternoon and Wednesday (Weekly holiday).

Nehru Champion Colleges Hockey Tournament



**Shri M S Bhagwati, Secretary, Department of Youth Affairs & Sports being introduced to the participating teams
He is accompanied by Prof. K B Powar, Secretary General, AIU and Prof. Saiyid Hamid.
Chairman Organising Committee and former VC, Aligarh Muslim University**



**Dr. S N Das, Director (Personnel), Steel Authority of India Ltd. awarding the cash prizes
at the concluding function On his right are Prof. S.K. Agrawala and Prof. K.B. Powar,
former and present Secretary General, AIU respectively.**

South Zone Youth Festival



A view of the March past by the participants



Mr E.T. Mohammed Basheer, Kerala State Minister of Youth Affairs & Sports giving away the prizes. He is flanked by Mr. Sampson David, Sr Cultural Officer, AIU (left) and Prof. A.N.P. Unnithan, Vice-Chancellor (Right).